AGE OF INVENTORS

RULEBOOK

THE GOLDEN AGE OF INVENTION BEGINS

As humanity is entering the second half of the 19th century, a series of Inventions is about to change where and how people live, work, travel, and communicate. The Age of Inventors is upon us. Will you lead humanity's charge into a bright new future?

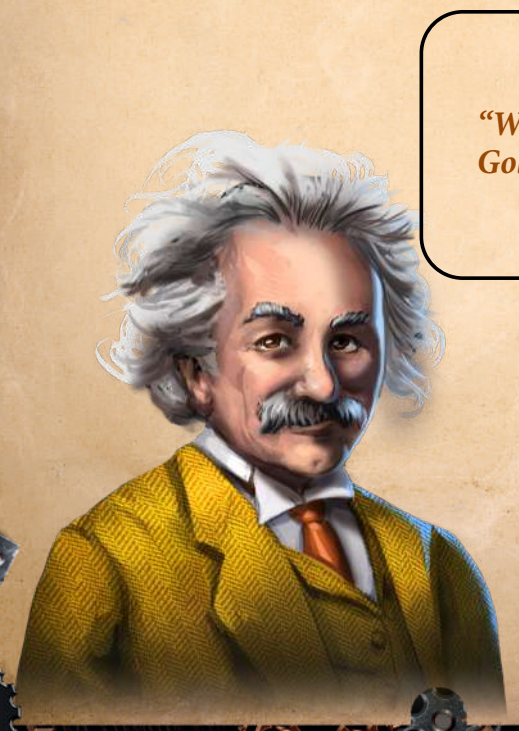
Players run laboratories owned and funded by different institutions or patrons. They will purchase equipment, recruit inventors, and help the inventors complete their inventions to advance humanity's progress in different tracks (Industrial, Economic, and Academic). The player whose laboratory contributes the most to society will be crowned the winner at the end of the game.

CLARIFICATION ON WHAT THIS GAME IS AND WHAT IT IS NOT

Age of Inventors is a fun, family board game. Its goal is to help the players enjoy quality time together while competing on an interesting theme. Although you are bound to learn some things by playing this game, this is not the primary goal of this game.

Our aim is to capture the spirit of the Age of Invention and spark curiosity in our players. We love science, inventions, and innovation, and we want to share this passion with you. The information in this game is inspired by real history but may not always be historically precise. Many academics continue to debate who truly invented certain technologies or the exact dates of their discoveries.

This game is intended to spark interest in the Age of Invention by offering a rough idea in the context of a board game. We suggest you follow your interests from there and hunt for real knowledge in books, research publications, libraries, and universities. We hope you will fall in love with this era as we did. Have fun!



"Who would you be in the Golden Age of Invention?"

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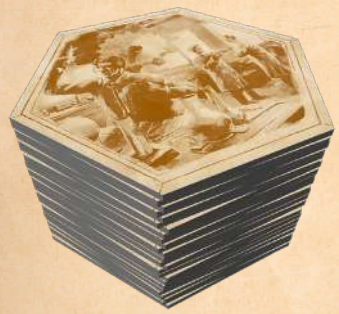
COMPONENT LIST

MAIN BOARD

PLAYER LABS
x 4

ABEL PRIZE TOKENS
x 7



INVENTOR HEX
x 24

INVENTION HEX
x 48

EQUIPMENT
TOKENS x 25

EXPERIMENT
TOKENS x 26

BREAKTHROUGH
TOKENS x 16

BREAKING NEWS
CARDS x 17

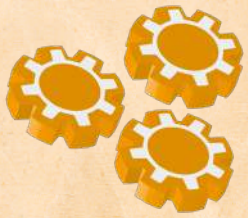
REFERENCE CARDS x 4

INVENTOR CARDS x 24

COMPONENT LIST

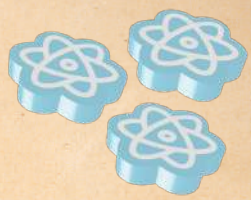
LAB ASSISTANTS WOODEN COMPONENTS x 16

BOOKS WOODEN COMPONENTS x 24



ENGINEERING WOODEN COMPONENTS x 30

CHEMISTRY WOODEN COMPONENTS x 30



PHYSICS WOODEN COMPONENTS x 30

TURN ORDER WOODEN COMPONENTS x 4

INGENUITY WOODEN COMPONENTS x 4

INDUSTRIAL WOODEN COMPONENTS x 4

ECONOMIC WOODEN COMPONENTS x 4

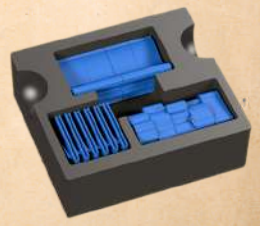
ACADEMIC WOODEN COMPONENTS x 4

IDEAS WOODEN COMPONENTS x 30

MEDAL TOKENS x 3

POUCH

COMMON SUPPLY INSERT



PLAYER INSERT x 4

If you want to become an Inventor you have to get your hands dirty! It is not as hard as it looks.

Identify your Lab's strong points and use them to your advantage.

ASSEMBLY INSTRUCTIONS

1. Punch out all Tokens from the punchboards.

2. Take a Lab and attach a rivet and two Fund Indicators (gears), one on each side. Repeat for all four double-sided Labs.

3. Take a Lab and attach four rivets and four Switches on each side. Repeat for all four double-sided Labs.

4. Take the Center Hex indicating the clock component and attach a rivet and the hand.

5. Put all Breakthrough Tokens into the pouch.

PLAYER LAB SETUP

1. There are four Labs available, one for each player: Government Lab, Corporation Lab, University Lab, and Innovator Lab. In order to decide who gets to choose their Lab first, the players can either randomly distribute them or test their knowledge on the great Inventions. In that case, draw a random Invention Hex; each player guesses the year in which it was invented. Check the back cover of the rulebook to learn the date, then choose Labs based on whose response was the closest.

2. Having selected Labs, each player now gets to choose which side they will use. Each side has different attributes and different abilities. Players can learn more about the special abilities of each side on page 19. Players should place their Lab in front of them with the selected side facing up.

3. In the order the Labs were chosen, each player chooses a color and takes the player insert and Wooden Components of that color.

4. Each player takes one of the four identical Reference Cards and places it somewhere where it will be easy to reference.

5. Each player collects 1 of each Scientific Resource (Physics, Chemistry, and Engineering), 1 Idea, and sets their Funds dial to 5.

6. Each player draws 2 Inventor Cards, choosing 1 Inventor to place face up next to their Lab. They then draw 4 Inventions Hexes, keeping 2 in their hand. The remaining Inventors and Inventions are all shuffled back into their respective decks.

7. Each player collects any additional Wooden Components indicated on their Lab (shown underneath the initial Position in the Ingenuity Track).

MAIN BOARD SETUP

1. Place the board in the middle of the table where all players can easily reach it.

2. Set the round counter to 1.

3. Each player places their Ingenuity Wooden Components on the Ingenuity Track. Your Position in the Ingenuity Track is indicated under your Player Lab's name.

4. Shuffle the Experiment Tokens into a stack and place the stack face down on its position at the top and center of the board.

5. Shuffle the Equipment Tokens into a stack and place the stack face down on its position at the top left of the board.

6. Populate the Equipment Offer by drawing Equipment Tokens from the stack and placing them in the Offer starting with the position with the icon 0. Place as much Equipment Tokens as the number of players plus 1.

7. Shuffle the Breaking News Cards into a deck and place the deck face down on its position at the left of the board.

8. Shuffle the Invention Hexes into a stack and place them on the Invention Offer at the bottom left of the board. Then populate the Offer by placing the top Invention Hex face up on the position indicated by 1, then the next one on the position indicated by 2, and the last one at the position indicated by 3.

9. Shuffle the Inventor Cards into a deck and place that deck on the Inventor Cards Offer at the bottom of the board. Then populate the Inventor Cards Offer by placing the top Inventor Card face up on the position indicated by 2, then the next one on the position indicated by 4 , and the last one at the position indicated as 6.

10. Players may keep the Inventor Hexes in their insert or, if there is enough space, lay them out face-up on the table. Whenever a player gains an Inventor Card, they should also claim the matching available Inventor Hex and place it face-up next to the Card. Players should now claim the Inventor Hex corresponding to the initial Inventor Card they selected.

A High position in the Ingenuity Track may win you the game. Climb up there!

Not all Equipment Tokens are equal. Make sure to secure the ones you need for your Lab "engine".

GAME STRUCTURE

The game is played in Rounds, each consisting of two phases: the Upkeep Phase and the Player Phase.

Each Round begins with the Upkeep Phase, which consists of seven steps—most of which are performed simultaneously by all players. Once the Upkeep Phase is complete, the Player Phase begins. During the Player Phase, players take turns performing actions. When all players have finished their turns, the Round ends.

GAME END

The game ends when either of the following conditions is met:

- The fourth and final Round is concluded.

- A player places an Inventor or Invention on the last empty Hex of the Hex Grid. In this case, the game immediately ends, even if players still have actions remaining.

At the end of the game, players total their points from Tracks, Experiments, Breakthrough Tokens, and Ingenuity. The player with the most points wins. (See Page 21 for details.)

UPKEEP PHASE

Turn your Reference Card so the Upkeep Phase side is up. The Reference Card can guide you on the steps that take place during the Upkeep Phase.

During the first round only, skip steps 1 to 5 and start the game at step 6. For every other round, follow all steps in the following order:

1. Collect your Lab Assistants and Turn Order Wooden Components. (simultaneous).

Collect any of your Lab Assistants you used the previous round and place them on your player insert. Also collect your Turn Order Wooden Components.

2. Reset your Switches and Inventor Abilities. (simultaneous)

Reset your Switches so they all are on the OFF position, pointing on the left. Reset any Inventors you triggered last turn so they are again placed horizontally under your Lab.

3. Increase the Round Counter. (simultaneous)

Move the clock hand from the current round to the next one.

4. Draw a Breaking News Card.

Each Breaking News Card consists of the card's title, lore (historical fact that made the news at the time), and two gameplay options that will alter the way this round is played. Players will choose one of the effects to take place for the current round. Each Breaking News Card is discarded at the end of the round.

In order to decide which effect will be applied, the players vote. To vote, read the card's two options. First, read the option on the left, then the option on the right. Players who want the first (left) option will vote with thumbs up; players who want the second (right) option will vote with thumbs down.

After reading both options, all players should extend a closed fist over the main board and count to 3. On 3, each player should show either a thumbs up or a thumbs down sign with their hand, indicating their choice. The option with the most votes will affect the game this round. The player with the highest Ingenuity rating breaks ties.

5. Earn Funds based on Ingenuity. (simultaneous)

Increases the funds at your Lab by the amount indicated by your position on the Ingenuity Track.

Switches are the most valuable comodity in this game. Make sure to plan carefully where to use them.

Inventors are the locomotive that will carry you through the game. Use their abilities efficiently.

Sometimes claiming the the first position in the Play Order can be more valuable than selecting which Equipment to acquire.

6. Draft Equipment

First, slide any remaining Equipment Tokens to the right and re-populate the Track's empty positions starting from the right (least-expensive) to the left (most-expensive). Remember you should have face up Equipment Tokens equal to the number of players plus one.

Then, starting with the player that is the first on the Ingenuity Track, look at the different Equipment Tokens and select the one you would like to purchase. Immediately pay the appropriate cost in funds indicated under the Equipment Token's position, and move your Turn Order Wooden Component from your player insert to the slot where the Equipment Token was.

Important: This will determine turn order in the Player Phase. The order is determined from left to right.

You may then place the Equipment Token into a position on your Lab. Each slot has a different bonus. By placing the Equipment Token in a slot, you immediately gain that bonus, if applicable.

7. Activate Lab Equipment (simultaneous)

Last, activate all your Lab Equipment. You gain Lab Equipment every time you place your chosen Equipment Token on an empty slot on your Lab.. In the first round, you will only have 1. In the fourth round, you should have four. Activate them and gain their bonus (if able) in any order.

Once all players have concluded all steps, everyone flips their Reference Card to the Player Phase side and proceeds to the Player Phase.

Plan ahead to determine the best order in which to place your Equipment Tokens to receive the Slot Bonus.

Select the order in which best fits you to activate your Lab Equipment. Some times it is really important.

PLAYER PHASE

In the Player Phase, all players act based on the order of their Turn Order Wooden Components, with the player whose Turn Order Wooden Component is farthest left taking their turn first.

During your turn, you can either Place a Lab Assistant or use a Switch. There are also two free actions that you can take at anytime during your turn. When you have either placed a Lab Assistant or used a Switch, you end your turn and it is the next player's turn.

ASSIGN A LAB ASSISTANT

You can place your Lab Assistants in several locations. By doing this, you effectively lock the location so that no other Lab Assistant can be placed there for the rest of the round.

- ***Activate Lab Equipment***

  Place a Lab Assistant on an Equipment Token in your Lab and gain the benefit or perform the action allowed by that Equipment Token. You can also assign a Lab Assistant to the position that grants ANY Scientific Resource.

- ***Benefit from Available Inventor Hexes Conversions***

  Place a Lab Assistant on an unoccupied Book Base (i.e., a Book Base that does not already have a Lab Assistant placed on it, which would mark it as occupied). Then do the printed conversion by giving the Book Base's owner the needed resources and gaining the benefit from the common supply. If you own the Book Base, give the needed resources to the common supply.

Do not hurry to place Lab Assistants to your Equipment. No other player can use them, only you.

Try to secure the locations available by Inventors before other players do. Place your Lab Assistants as soon as possible.

"Place Inventors, as soon as possible and let your opponents use them. In the long run you will gain a lot of resources"

Increasing Your Position in the Ingenuity Track is all about timing. Keep an eye on the enemy Ideas and plan when to strike…

- ***Increase Your Position on the Ingenuity Track***

  Place a Lab Assistant on an unoccupied location in the Ingenuity Track and pay the indicated number of Ideas to the common supply. Then your Ingenuity Wooden Component exchanges positions in the Ingenuity Track with the next higher Ingenuity token. You are allowed to use this action even if you are occupying the first position in the Ingenuity track. While it might not increase your Position in the Ingenuity Track, it does make it more expensive for other players to move you from this prestigious position as the next available location will be more expensive.

- ***Collect an Experiment Token***

  Place a Lab Assistant on any empty spot in the Experiment Tokens area. Then, pay 2 to draw the top Experiment Token from the Experiment Token Pile and place it face-down next to your Lab. While it remains face-down, the Experiment Token is considered Unverified and is worth 1 Victory Point at the end of the game. You may not look at the other side of an Unverified Token. When you reach the position with the on any of the three Scientific Tracks, you may flip one Unverified Experiment Token to its Verified side. The token is now Verified and will be worth the number of Victory Points printed on it. If you have no Unverified Tokens at that time, draw a new Experiment Token from the Experiment Token Pile and place it face-down, Unverified, next to your Lab.

  Alternatively, you may Verify any number of Experiment Tokens at the end of the game by spending 4 per Unverified Experiment Token to Verify them. At the end of the game, Verified Experiment Tokens score the number of Victory Points printed on them, while Unverified Tokens that remain face-down score only 1 Victory Point each.

Experiments may seem expensive, but at the end of the game, they are the best way to gain the extra edge you need.

Refreshing the offers may turn the table upside down. Sometimes literally…

- ***Refresh Inventions or Inventors Offer(s)***

  Place one of your Lab Assistants on an unoccupied Refresh location. After paying 2 Funds, you can either replace all the Inventions, all the Inventors, or both in their respective Offer areas. To replace, place all 3 of those Hexes/Cards in the Offer area at the bottom of their respective stack/deck (All Tiles/Cards that were replaced using the refresh action should be moved to the bottom of the stack/deck.). Then draw and repopulate that Offer. After you do so, you may immediately use 1 Switch to either recruit one of the Inventors or conceive one Invention drawn this way, paying normally.

USE A SWITCH

To use a Switch, rotate it from the left OFF position to the right ON position.

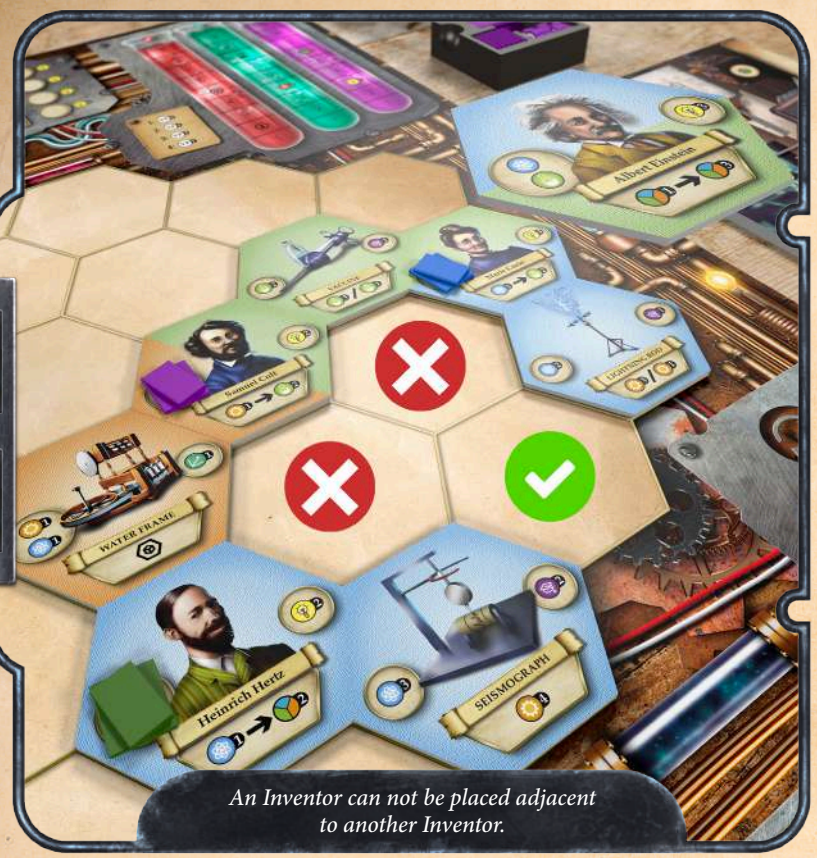
You can use one of your active Switches to do one of the following:

- ***Recruit an Inventor***
  - » Pay the indicated cost in Funds, as shown beneath the Inventor Card on the Main Board.
  - » Choose and gain an Inventor Card from the Offer to your hand. You may not place the Inventor yet; keep the recruited Inventor face up next to your Lab. You may also take the corresponding Inventor Hex and keep it also face up next to your Lab.
  - » Slide all remaining Inventor Cards in the Offer towards the least expensive position and repopulate the missing position with the top card from the deck.

- ***Conceive an Invention***
  - » Pay the indicated cost in Ideas, as shown next to the Invention Hex on the Main Board.
  - » Choose and gain an Invention Hex from the Offer to your hand. You may not place the Invention yet; keep it concealed in your hand.
  - » Slide all remaining Invention Hexes in the Offer towards the least expensive position and repopulate the missing position with the top Hex from the stack.

When selecting an Inventor do not only consider their fields, ideas and cost. Study their Abilities and how you may use them.

Select Inventions not only based on their Track and Points. Their instant abilities might be more useful than you think!



An Inventor can not be placed adjacent to another Inventor.

It takes an Engineer to allow an Engineering Invention to be placed.

- ***Scientific Fields***
  - » Inventor Hexes can feature up to three different Scientific Fields, each represented by a distinct color. These fields indicate the types of Inventions an Inventor is capable of inventing. The three Scientific Fields are:
  - » Engineering – represented by the color red
  - » Chemistry – represented by the color green
  - » Physics – represented by the color blue
  - » An Inventor Hex may feature one or two of these Scientific Fields.
  - » Invention Hexes are also categorized by Scientific Field. Each Invention Hex features a single color, corresponding to one of the three aforementioned Scientific Fields.
- ***Place an Inventor***
  - » Choose which Inventor you want to place and pay 1 of the Inventor's Scientific Resources to the common supply. If the Inventor has two Scientific Fields, you must choose 1 of the two to pay with. For example, to place Nikola Tesla, you need to pay either 1 Engineering (represented by the color blue) or 1 Physics (represented by the color green).
  - » Place the Inventor Hex on an eligible spot on the Hex Grid. Eligible spots for Inventor Hexes are any spots that are not adjacent to any other Inventor. You can place Inventor Hexes adjacent to the Round Marker Hex at the center of the grid.
  - » As soon as you place the Inventor Hex, place one of your Book Bases on top of them. This signifies your Inventor is active and any player, including you, may place a Lab Assistant on top of the Book Base in order to gain your Inventor's Conversion Ability.
  - » After placing a Book Base, immediately gain a number of Ideas as indicated on the right side of the Inventor Hex.
  - » Once you have placed the Book Base and gained Ideas, place the Inventor's Card on an available spot at the bottom of your Lab where it becomes immediately active. If all spots are occupied, you may choose to replace one of the three Inventor Cards you have with the new one. If you do not want to, simply discard the Inventor Card effectively losing it. The Inventor Hex remains on the Hex Grid regardless of what you do with the corresponding card.

- ***Scientific Resources***
  - » Scientific Resources are mainly used to place Invention Hexes. There are three types:
  - » Engineering
  - » Chemistry
  - » Physics
  - » Each Scientific Resource has a corresponding Wooden Component that matches in both color and symbol.

- ***Place an Invention***
  - » Pay, to the common supply, the cost of Scientific Resources indicated on the left side of the Invention Hex. For example, the Helicopter Invention requires 2 Engineering, 1 Chemistry, and 1 Physics.
  - » Place an Invention Hex from your hand on an eligible spot on the Hex Grid. That spot must be unoccupied and adjacent to an Inventor whose adjacent side matches the Invention's Scientific Field (color). If there is more than one Inventor Hex with an available adjacent edge matching the Invention Hex, then you get to choose where to place the Invention Hex.
  - » By placing an Invention Hex, you immediately activate that Invention's instant ability and advance your position in one of the three Tracks as described on page 16.

INVENTION ABILITIES

Each Invention offers a unique instant ability that immediately resolves after placing an Invention. Each ability is displayed with a list of symbols explained here. X and Y correspond to various numbers of the specific abilities.

ChemistryX

Refers to X amount of Chemistry Wooden Components. If found in an Invention Ability text, it means you gain that many Chemistry Wooden Components.

EngineeringX

Refers to X amount of Engineering Wooden Components. If found in an Invention Ability text, it means you gain that many Engineering Wooden Components.

PhysicsX

Refers to X amount of Physics Wooden Components. If found in an Invention Ability text, it means you gain that many Physics Wooden Components.

EngineeringX / EngineeringY

The player who placed the Invention Hex gains X Engineering Wooden Components; all other players gain Y Engineering Wooden Components.

PhysicsX / PhysicsY

The player who placed the Invention Hex gains X Physics Wooden Components; all other players gain Y Physics Wooden Components.

ChemistryX / ChemistryY

The player who placed the Invention Hex gains X Chemistry Wooden Components; all other players gain Y Chemistry Wooden Components.

Idea

Refers to the Idea Wooden Component.

Idea X

Refers to X amount of Idea Wooden Components. If found in an Invention Ability text, it means you gain that many Idea Wooden Components.

Innovative Ideas

The player who placed the Invention Hex gains a number of Idea Wooden Components equal to 1 + the number of players below them on the Ingenuity Track. For example, in a two-player game, the person who is first on the Ingenuity Track would gain 2, 1 + 1 for the one player below them. If they were second, they would only gain 1, 1 + 0 for the zero players below them. In a four-player game, the person in the second place on the Ingenuity Track would gain 3, 1 + 2 for the two players below them.

Innovative Inventors

The player who placed the Invention Hex draws a number of face down Inventor Cards from the top of the Inventors Deck equal to 1 + the number of players below them on the Ingenuity Track. For example, in a two-player game, the person who is first on the Ingenuity Track would draw 2 Inventor Cards, 1 + 1 for the one player below them. If they were second, they would only draw 1 Inventor Card, 1 + 0 for the zero players below them. In a four-player game, the person in the second place on the Ingenuity Track would draw 3 Inventor Cards, 1 + 2 for the two players below them.

ICONOGRAPHY

Innovative Lab

The player who placed the Invention Hex resets a number of Switches equal to 1 + the number of players below them on the Ingenuity Track. For example, in a two-player game, the person who is first on the Ingenuity Track would reset 2 Switches, 1 + 1 for the one player below them. If they were second, they would only reset 1 Switch, 1 + 0 for the zero players below them. In a four-player game, the person in the second place on the Ingenuity Track would reset 3 Switches, 1 + 2 for the two players below them.

Innovative Funding

The player who placed the Invention Hex gains a number of Funds equal to 1 + the number of players below them on the Ingenuity Track. For example, in a two-player game, the person who is first on the Ingenuity Track would gain 2, 1 + 1 for the one player below them. If they were second, they would only gain 1, 1 + 0 for the zero players below them. In a four-player game, the person in the second place on the Ingenuity Track would gain 3, 1 + 2 for the two players below them.

Innovative Resourcing

The player who placed the Invention Hex gains a number of Scientific Resources, in any compination, equal to 1 + the number of players below them on the Ingenuity Track. For example, in a two-player game, the person who is first on the Ingenuity Track would gain 2, 1 + 1 for the one player below them. If they were second, they would only gain 1, 1 + 0 for the zero players below them. In a four-player game, the person in the second place on the Ingenuity Track would gain 3, 1 + 2 for the two players below them.

Innovative Engineering

The player who placed the Invention Hex gains a number of Engineering Wooden Components, in any compination, equal to 1 + the number of players below them on the Ingenuity Track. For example, in a two-player game, the person who is first on the Ingenuity Track would gain 2, 1 + 1 for the one player below them. If they were second, they would only gain 1, 1 + 0 for the zero players below them. In a four-player game, the person in the second place on the Ingenuity Track would gain 3, 1 + 2 for the two players below them.

Innovative Physics

The player who placed the Invention Hex gains a number of Physics Wooden Components, in any compination, equal to 1 + the number of players below them on the Ingenuity Track. For example, in a two-player game, the person who is first on the Ingenuity Track would gain 2, 1 + 1 for the one player below them. If they were second, they would only gain 1, 1 + 0 for the zero players below them. In a four-player game, the person in the second place on the Ingenuity Track would gain 3, 1 + 2 for the two players below them.

Innovative Chemistry

The player who placed the Invention Hex gains a number of Chemistry Wooden Components, in any compination, equal to 1 + the number of players below them on the Ingenuity Track. For example, in a two-player game, the person who is first on the Ingenuity Track would gain 2, 1 + 1 for the one player below them. If they were second, they would only gain 1, 1 + 0 for the zero players below them. In a four-player game, the person in the second place on the Ingenuity Track would gain 3, 1 + 2 for the two players below them.

FundsX

Refers to X amount of Funds. If found in an Invention Ability text, it means you gain that many Funds.

Steal Funds

All players that are below you on the Ingenuity Track must give you X Funds. They reduce their Funds by X and you gain Funds equal to the amount of Funds reduced this way. If a player's Funds are less than the amount you are attempting to steal, they reduce their Funds to 0 and you gain Funds equal to the amount that was subtracted from that player.

Steal Ideas

All players that are below you on the Ingenuity Track must give you X Idea Wooden Components. They remove X Idea Wooden Components from their supply and you gain a number of Idea Wooden Components equal to the amount of Idea Wooden Components removed this way. If a player's Idea Wooden Components are less than the amount you are attempting to steal, they remove all of their Idea Wooden Components and you gain an amount of Idea Wooden Components equal to the amount that was removed from that player.

Steal Engineering

All players that are below you on the Ingenuity Track must give you X Engineering Wooden Components. They remove X Engineering Wooden Components from their supply and you gain a number of Engineering Wooden Components equal to the amount of Engineering Wooden Components removed this way. If a player's Engineering Wooden Components are less than the amount you are attempting to steal, they remove all of their Engineering Wooden Components and you gain an amount of Engineering Wooden Components equal to the amount that was removed from that player.

Steal Physics

All players that are below you on the Ingenuity Track must give you X Physics Wooden Components. They remove X Physics Wooden Components from their supply and you gain a number of Physics Wooden Components equal to the amount of Physics Wooden

Components removed this way. If a player's Physics Wooden Components are less than the amount you are attempting to steal, they remove all of their Physics Wooden Components and you gain an amount of Physics Wooden Components equal to the amount that was removed from that player.

Steal Chemistry

All players that are below you on the Ingenuity Track must give you X Chemistry Wooden Components. They remove X Chemistry Wooden Components from their supply and you gain a number of Chemistry Wooden Components equal to the amount of Chemistry Wooden Components removed this way. If a player's Chemistry Wooden Components are less than the amount you are attempting to steal, they remove all of their Chemistry Wooden Components and you gain an amount of Chemistry Wooden Components equal to the amount that was removed from that player.

Steal Inventors

Randomly select and gain 1 Inventor Card from players' hands from all players that are below you on the Ingenuity Track. If a player has no Inventor Cards in his hand, then you select and gain no Inventor Cards from that player.

Inventor

Refers to any one Inventor Hex.

AnyX

Refers to Any Combination of X Scientific Resources. If found in an Invention Ability text, it means draw the top face down Inventor Card from the Inventors Deck.

Any3

Select and gain any combination of the 3 scientific resources from the common supply. For example, you can choose, 1, 1, and 1, or any other possible combination. Remember, is not a Scientific Resource.

Invention

Refers to any one Invention Hex. If found in an Invention Ability text, it means you draw one face down Invention Hex from the Inventions Stack.

Draw Double Invention

Draw the top 2 face down Invention Hexes from the Inventions Stack.

Draw Double Inventor

Draw the top 2 face down Inventor Cards from the Inventors Deck.

Switch

Refers to the Switches on a Lab.

X *Reset X Switches*

Immediately reset up to X of your Lab's Switches.

Steal Switch

Each player below you on the Ingenuity Track must use an unused Switch with no effect. You reset a number of Switches on your Lab, equal to the number of Switches that were used this way.

Steal Inventions

Randomly select and gain 1 Invention Hex from players' hands from all players that are below you on the Ingenuity Track. If a player has no Invention Hexes in his hand, then you select and gain no Invention Hexes from that player.

-X *Place Invention with - X Cost*

You may immediately use one available Switch to place one extra Invention from your hand at a reduced cost. You get to select which X Scientific Resources you will not pay. If the resource reduction is equal to or greater than the number of required Scientific Resources, you can place the Invention Hex for free. There is no limit to how many Inventions you can place in one round with this ability. Normal placing rules still apply.

Equipment Token

Refers to any one Equipment Token. If found in an Invention Ability text, it means that you may activate one Equipment Tokens in your Lab as if you had placed a Lab Assistant on it. You may even activate equipment that has already been activated by your Lab Assistants.

X *Activate X Lab Equipment*

You may activate up to X different Equipment Tokens in your Lab as if you had placed a Lab Assistant on it. You may even activate equipment that has already been activated by your Lab Assistants.

Gain Experiment Token

Gain the top face down Experiment Token from the Experiment Pile.

Industrial

Refers to the Industrial Track.

Economic

Refers to the Economic Track.

ICONOGRAPHY

Academic

Refers to the Academic Track.

Industrial Invention

An Invention that advances you “X” positions on the Industrial Track.

Economic Invention

An Invention that advances you “X” positions on the Economic Track.

Academic Invention

An Invention that advances you “X” positions on the Academic Track.

Engineering Invention

An Invention Hex of red color. These Invention Hexes can be placed adjacent to an Engineering Field Inventor who features the same red color.

Chemistry Invention

An Invention Hex of green color. These Invention Hexes can be placed adjacent to a Chemistry Field Inventor who features the same green color.

Physics Invention

An Invention Hex of blue color. These Invention Hexes can be placed adjacent to a Physics Field Inventor who features the same blue color.

Conversion

Return X Resources as shown in the first circle to the common supply and gain Y Resources as shown on the second circle.

Ingenuity

Refers to the Ingenuity Track on the Main Board.

Steal

Always followed by another icon. This icon indicates that you are taking something from all other players; reducing their supply of that item while increasing your own.

Funds

Refers to Funds. The number found behind the gear of your Lab.

Funds

Refers to any of the three Scientific Resources. Engineering, Physics, and Chemistry.

Engineering

Refers to the Engineering Scientific Resource.

Chemistry

Refers to the Chemistry Scientific Resource.

Physics

Refers to the Physics Scientific Resource.

Breakthrough Tokens

Draw one Breakthrough Token from the pouch.

THE THREE SCIENTIFIC TRACKS

The Industrial, Economic, and Academic Tracks represent humanity's advancement in the respective fields. All players start outside of the three Scientific Tracks. The first time an ability would advance them to one of the three Tracks, they enter the Track and advance counting the first movement on the first position of that Track. After placing an Invention, you immediately get to advance on the appropriate track based on the icon on the right side of the Invention. When you reach or cross a Milestone Bonus, you get that bonus immediately. All players who cross a Milestone Bonus gain the bonus.

If, after advancing on a Track, you are now the player who has advanced the farthest on that Track, take the corresponding Track Medal. Track Medallions grant a unique passive effect that is effective immediately.

- The Industrial Medal allows you to use Engineering Wooden Components as any other Scientific Resource when paying to place Invention Hexes.
- The Economic Medal allows you to use Chemistry Wooden Components as any other Scientific Resource when paying to place Invention Hexes.
- The Academic Medal allows you to use Physics Wooden Components as any other Scientific Resource when paying to place Invention Hexes.

The three Medals offer their bonuses only when placing Invention Hexes. You cannot use this substitution on a conversion or in any other circumstance.

It is common for Medals to frequently swap between players during the game as players compete on the three Tracks.

It is important to climb the Tracks in order to win Victory Points. At the end of the game, the player who has advanced highest up a Track wins 8 Victory Points. Once a player has reached the top position on a Track, they are locked in and cannot be passed. 2nd and 3rd place could be locked as well if enough people are playing. The second highest player wins 4, third highest wins 2, and lowest wins 1. Note that in order to gain Victory Points from a Track, you must have made it onto the Track at some point during the game.

Time when you place Inventions to gain the most out of the milestone bonuses on the three tracks.

RETIRING AN INVENTOR

When an Inventor Hex is completely surrounded by other Hexes, they are considered Retired. Three things happen when an Inventor is retired:

- The player who owns this Inventor Hex must remove the Book Base from that Inventor Hex. Lab Assistants can no longer be assigned to that Inventor's Hex.
- The player who owned that Inventor Hex must also discard the matching Inventor Card from their Lab if able. They can no longer use the Inventor Card's ability.
- The player who placed the last Hex and retired the Inventor Hex gets to take the pouch and randomly select a Breakthrough Token from it. Look at it, then place it face down next to your lab. Do not show it to the other players. These are hidden Victory Points!

Thus, to retire an Inventor has threefold importance. You deny your opponent the resources gained from Inventor conversions, you deny them access to the Inventor ability, and you gain hidden Victory Points.

Retire your opponents Inventors to gain hidden victory points but also to deny them of their Inventor Abilities.

ADDITIONAL FREE ACTIONS

Additionally, during each player's turn, they can do the following actions as many times as they want:

Instant Conversions

There are three different resource conversions you can do for free. You can convert…

- …any 3 matching Scientific Resources into 1 Idea
- …any 2 matching Scientific Resources into any 1 Scientific Resource
- ...any 1 Scientific Resource into 1 Fund

"Gathering your resources wisely will protect you from needing to use instant conversions, and thus lose resources."


You will use Instant conversions when you need them. Plan ahead so you do not have to.

Make sure that a round does not pass by without you taking advantage of your Inventors ability.

Inventor Abilities

As soon as you place an Inventor's Hex on the Hex Grid, also place that Inventor's Card below your Lab. While an Inventor's Card is in your Lab, you can automatically benefit from that Inventor's ability. Some abilities are automatically activated when a certain condition happens.

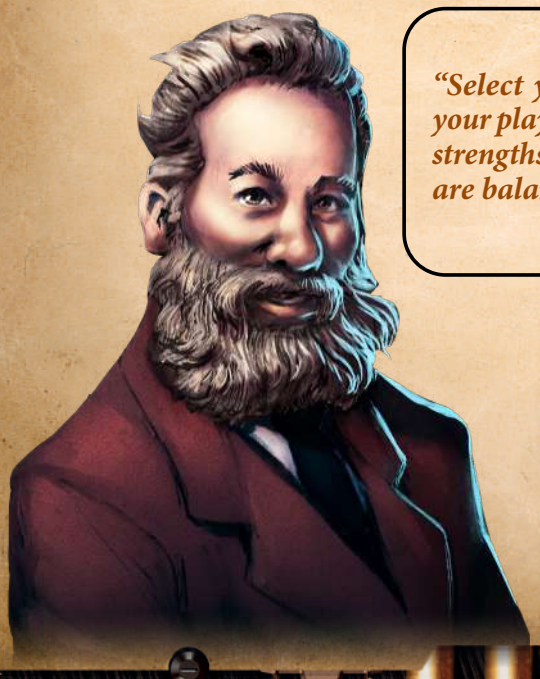
For example, Charles Wheatstone's ability states, "You may place next to any Inventor." This ability automatically takes place when you are placing an Invention Hex and negates the placing restriction of all Physics Invention Hexes (for you). You can now place Physics Inventions next to Inventor Hexes of any type.

However, some Abilities must be activated, or triggered, in order to be used. You can spot which Inventors' abilities require them to be triggered by this symbol at the beginning of the Inventor's Card ability. You can trigger any number of your Inventor Cards, but only during your turn. When you trigger an Inventor Card rotate it to the vertical position. You cannot use it again until it is reset, usually at the next Upkeep Phase.

For example, Henry Ford's ability states: "Trigger: Choose either or . Use a Switch to draw the first one for free." When you trigger Henry Ford, state if you are searching for an Engineering or an Industrial Invention Hex. Then draw the top Invention Hex from the stack. If it is of the type you are searching for, you get to conceive it for free. If it isn't, put it at the bottom of the stack and draw until you find an Invention Hex of the correct type.

END OF THE ROUND

When you do not have any actions left (you placed all your Lab Assistants and used all four of your Switches) or you do not want to take any more actions, you pass your round. This means that you flip your Reference Card to the Upkeep Phase and wait for everyone else to end their Player Phase. Be careful, however, because if you pass, you cannot change your mind and return to the Player Phase even if something in the game changes in a way that enables you to perform an action that you could not do earlier. When all players have flipped their Reference Cards to the Upkeep Phase, the new round begins.



"Select your Lab according to your play style. Each has its own strengths and weaknesses but all are balanced"

GOVERNMENT LAB

Choose the Government if you like to break ties and influence the rules of the game. You can benefit from the success of others or prevent their progress by playing a Government Lab in the Age of Inventors!

Government Liberal

Progress: Whenever another players moves you on the Ingenuity Track, you may ↘↓↙ up to 1 from that Player. Additionaly, you may pay instead of to advance on the Ingenuity Track.

Government Authoritarian

Deep State: When resolving a Breaking News card, ↘↓↙ up to 1 from any player who voted differently than you. Additionaly, before selecting Equipment Token, you may rearrange the Offer.

CORPORATION LAB

Choose a Corporation Lab if you want to control the money supply and manage hiring. Corporations in the Age of Inventors grew dramatically as more people found it profitable to work there rather than toiling in the fields in traditional jobs.

Corporation Trading Firm

Entrepreneurship: When placing an receive equal to the , , and paid.

Corporation Manufacturing Co

Contracting: Whenever a new Inventor Card, enters the Offer, you may immediately pay the cost in as shown on the main board, under the Inventor Card, to recruit them without using a Switch.

UNIVERSITY LAB

Choose a University Lab to gain access to the most Scientific Resources and the brilliance of Inventors working together in synergy. This is where all the magic of the Age of Inventors took place.

University Metropolitan

Open Thesis: When assigning a to one of your you also gain the conversion of one not retired on the Main Board.

University Polytechnic

Dissertation: When using a Switch to place an you may also immediately place an adjacent to that by paying its cost, without using another Switch.

INNOVATOR LAB

Choose the Innovator's Lab if you want to avoid the bureaucracy of big institutions and simply believe in the value of your own ideas. Make things your own way because in the Age of Inventors, some of the greatest achievements did not require the backing of rich patrons but came to life from people who knew how to make something out of nothing!

Innovator Resourceful

Adaptive: When paying costs, you may use any amount of in place of , , , , or .

Innovator Visionary

Eureka: When Conceiving an you may Conceive an additional by paying its normal cost plus 1 additional .

ABEL PRIZE

Abel Prize

The Abel Prize is the most prestigious award for mathematicians. It is given every year by the King of Norway to exceptional mathematicians. The prize is named after Niels Henrik Abel, a renowned Norwegian mathematician, and is closely modeled after the Nobel Prizes.

Abel Prizes are symbolized by special Tokens that can be given to players who accomplish specific achievements. The player who successfully completes the achievement gets to keep the token as a prize, regardless of the number of games played. It serves as a lasting reminder of their valuable contribution to the field of science.

> Inventors : To receive this Token, a Player needs to place 7 Inventor Hexes and win the game!

> Inventions : To receive this Token, a Player needs to place 15 Invention Hexes and win the game!

> Physics : To receive this Token, a Player needs to have 11 remaining Physics Wooden Components at the end of the game and win! (He can still use these 11 Physics Wooden Components to Verify Experiment Tokens.)

> Chemistry : To receive this Token, a Player needs to have 11 remaining Chemistry Wooden Components at the end of the game and win! (He can still use these 11 Chemistry Wooden Components to Verify Experiment Tokens.)

> Engineering : To receive this Token, a Player needs to have 11 remaining Engineering Wooden Components at the end of the game and win! (He can still use these 11 Engineering Wooden Components to Verify Experiment Tokens.)

> Experiments : To receive this Token, a Player needs to have 5 Verified Experiment Tokens at the end of the game and win!

> Breakthrough : To receive this Token, a Player needs to retire 8 Inventor Hexes and win the game.

> Victory Points (VP): To receive this Token, a Player needs to win the game with at least 40 points.

PLAYING SOLO

Setup

- Select the Corporation: Trading Firm
- This solo mode is played as a two-player game in terms of mechanics. You are the first player.
- Place the second player's Ingenuity Wooden Component at the top position of the Ingenuity Track.
- Place the second player's Ingenuity Wooden Component in Position .
- This player will not act but it is considered to have infinite Scientific Resources, Idea Wooden Components, Invention Hexes, and Inventor Hexes in their possession when resolving other rules.
- Follow the rest of the rules for setting up normally.

Special Rules

- When drawing Equipment Tokens, draw 3 like in a two-player game.
- When gaining the bonus of an Invention Hex that grants you Innovation or Steal, resolve normally for a two-player game.
- Do not gain Breakthrough Tokens when Retiring Inventor Hexes.

Scoring

To calculate your Victory Points, add the following:

- Victory Points from the Three Scientific Tracks.
- Victory Points from any Verified Experiment Tokens.
- Victory Points from Funds at the end of the game. Gain 1 VP for every 5 Funds.
- Test your score with friends or online to see if you managed to score higher or simply try to beat your own high score!

EDUCATIONAL VARIANT

You may if you want play a variant of this game by introducing a special rule. Any player placing an Invention Hexes has the option of stating who invented it. If they correctly recall the inventor then they pay one less Scientific Resource. Alternatively, if you are really up for a challenge, they must state also the year the Invention was invented. The previous player may check the last page of the rulebook to see if they are right.

While checking, they might sneak a peek at the inventor and date of one of the inventions they plan to place next. However, they must put the rulebook away immediately after checking the other player.

This variant not only adds more fun to the game, but also teaches the players a few interesting facts about the Age of Inventors.

END OF GAME SCORING

At the end of the game, each player's score is calculated to determine the winner. Players earn points in four categories, as described below:

1. Scientific Tracks. Players receive Victory Points based on their position on each Scientific Track relative to the other players.

- 1st player: 8 Victory Points
- 2nd player: 4 Victory Points
- 3rd player: 2 Victory Points
- 4th player: 1 Victory Points
- Any player that did not enter a Scientific Track receives 0 Victory Points for that Track

For example, if you are 1st on the Industrial Track, 2nd on the Academic Track, and outside of the Economic Track you will be awarded 12 Victory Points at the end of the game. 8 Victory Points from the Industrial Track, 4 Victory Points from the Academic Track and 0 Victory Points from the Economic Track.

2. Ingenuity Track. Players receive Victory Points based on their position on the Ingenuity Track.

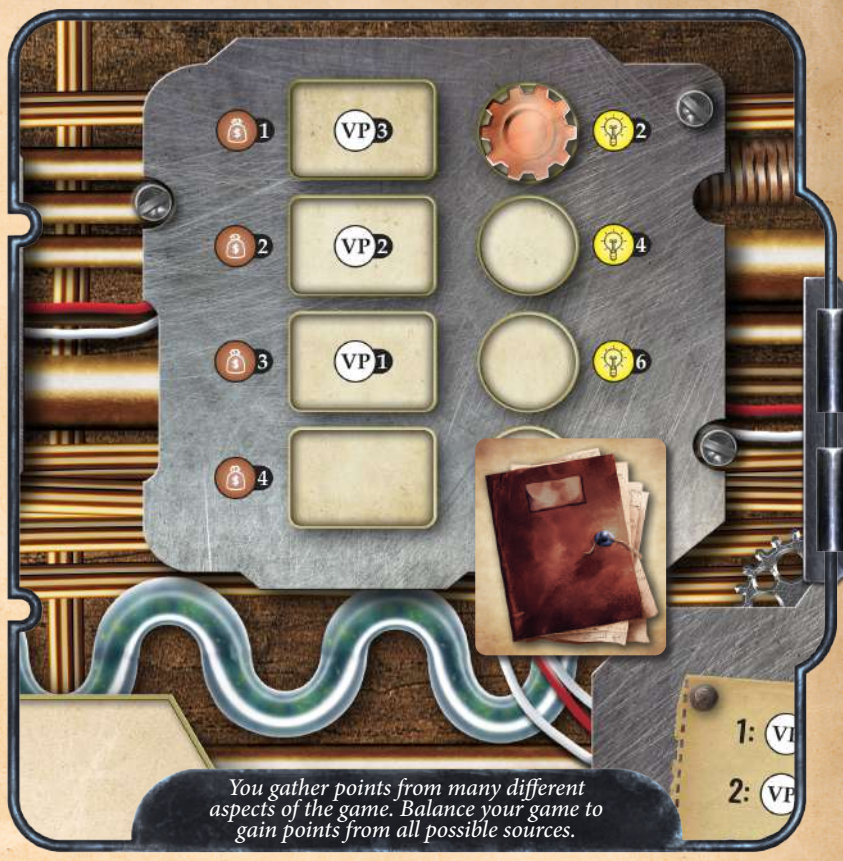
- 1st player: 4 Victory Points
- 2nd player: 2 Victory Points
- 3rd player: 1 Victory Points
- 4th player: 0 Victory Points

3. Breakthrough Tokens

- All players reveal the Breakthrough Tokens that have collected during the game and gain the Victory Points written on each one of them. For example, if you have 3 Breakthrough Tokens, two awarding 1 Victory Point and one awarding 2 Victory Points. You would gain 4 Victory Points from your three Breakthrough Tokens.

4. Experiment Tokens

At the end of the game, Verified Experiment Tokens score the number of Victory Points printed on them, while Unverified Tokens that remain face-down score only 1 Victory Point each.
If you want to Verify Experiment Tokens at the end of the game, you can spend 4 per Unverified Experiment Token to Verify them.



You gather points from many different aspects of the game. Balance your game to gain points from all possible sources.

"This is not a game of Luck. Learn from your mistakes and get back there. It took more than one try to get a plane in the air."

Do not let others stop your science progression. Create the longest lines of Lab Assistants and become the winner!

Try one of the kids' modes if you feel like playing in a more casual, carefree way. It is still both challenging and enjoyable!

KID'S MODE YOUNG ASSISTANTS

Setup:

- Children take a laboratory and cover the Equipment Offer with random Equipment Tokens face-down. They place the Funds indicator at 0 and set all their Switches to the off position.
- They take a Book and 4 Lab Assistants.
- They place the Round Indicator at 1.

Each round has 3 phases Conception, Progress and Breakthrough. For each one, follow the rules below.

Conception Phase:

- The youngest player goes first, and play proceeds clockwise.
- Create a stack of 8, 12, or 16 Invention Hexes, depending on the number of players (2, 3, or 4).
- Create a stack of 4, 6, or 8 Inventor Hexes, depending on the number of players (2, 3, or 4).
- All players take turns acquiring 2 Inventor Hexes and 4 Invention Hexes. Each Player takes 2 Hexes at a time until everyone has the required number.

Progress Phase:

- The youngest player goes first, and play proceeds clockwise.
- Players place 2 Hexes each time, following the placement rules of the game.

Breakthrough Phase:

- The youngest player goes first, and play proceeds clockwise.
- Each player places one of their Book Bases or Lab Assistants or Uses a Switch or Uses all the remaining Switches they have.
- The Book Base must be placed next to an inventor.
- The Lab Assistants must be placed next to their Book Base or next to a previous Lab Assistant of the same color, in an Invention Hex that matches the color of the Inventor Hex.
- When Using a Switch, you can take back a Lab Assistant and place them elsewhere at that moment.
- When all remaining Switches are played, score by adjusting the fund indicator based on the number of Lab Assistants placed in a row (the Book Bases do not count).

Game Over Condition:

The first player to reach 19 points wins immediately, or the player with the most points at the end of the 4 rounds wins. In case of a tie, the youngest player wins.

KID'S MODE YOUNG SCIENTISTS

The game is as normal with these exceptions:

- There are no Events in the Game
- There are no Inventor Cards in the Game. The Offer has the Inventor Hexes instead.
- You do not play your Lab's Abiltiies

Everything else is the same.

TESLA VS EDISON MODE

Setup:

- The youngest player chooses either Tesla or Edison. Both players take the Inventor Card of their choice.
- Each player selects a Lab. Tesla can choose one of the four University/ Innovator Laboratories, while Edison can choose one of the four Corporation/Government Laboratories. Both players place their Inventor Card, Edison or Tesla, on their laboratory. The player who chose Tesla goes first.
- Follow the normal setup rules as in the regular game for 2 players.

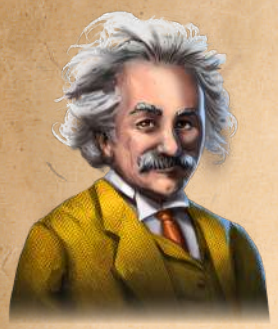
Play:

Same rules apply for the Upkeep Phase, with the addition that players remove any Lab Assistants from their Card or reset it.

For the player phase:

- Players can either play a Lab Assistant on their Card or trigger it by spending a Switch (they cannot do both in the same round).
- When Edison plays a Lab Assistant on his Card, he can move one of his Equipment Tokens from its current spot to another. By doing so, he gains both the Equipment Token's bonus and the bonus of the new covered spot by paying 2 Funds.
- When Edison uses the Switch to activate his Card, he randomly takes 2 Invention Hexes from Tesla's hand and keeps one of them, returning the other.
- When Tesla plays a Lab Assistant on his Card, he can place an Invention Hex at the bottom of the stack and take the Wooden Components it costs in his Lab by spending one .
- When Tesla uses a Switch to activate his card, he picks up and keeps 2 Invention Hexes from the stack by spending 2 .

INVENTORS



Albert Einstein

In the annals of scientific history, few names shine as brightly as that of Albert Einstein. Born on March 14, 1879, in Ulm, Germany, Einstein would become one of the greatest minds of the 20th century, leaving an indelible mark on the fields of physics and cosmology. His theory of relativity, symbolized by $E=mc^2$, transformed our understanding of the universe, unraveling the interconnectedness of space, time, and matter. Einstein's wisdom extended beyond science, as he believed that imagination surpassed knowledge, encouraging us to challenge boundaries and question the status quo.

Among the many intriguing moments in Einstein's life, one stands out as particularly exciting. In 1919, during a total solar eclipse, a team led by Arthur Eddington embarked on a daring expedition to test Einstein's theory of general relativity. The world waited with bated breath as the results were announced: Einstein had triumphed. The bending of light around the sun, predicted by his theory, was confirmed, propelling him to international fame and solidifying his place in scientific lore.

His Quote, "Imagination is more important than knowledge," reminds us that creativity and curiosity are vital for pushing the boundaries of human understanding. This quote encapsulates his belief in the power of unconventional thinking and the need to question the status quo.

Nikola Tesla

Tesla's groundbreaking work in alternating current (AC) power systems transformed the way we harness and distribute electricity, forever revolutionizing our modern world. His inventions, such as the induction motor and Tesla coil, laid the foundation for the electrification of cities and propelled humanity into a new era of progress.

One of Tesla's most famous quotes, "The present is theirs; the future, for which I really worked, is mine," encapsulates his unwavering belief in his own visionary ideas and his dedication to shaping a better world. This resolute mindset fueled his tireless efforts and propelled him to overcome numerous challenges and setbacks.

Tesla ultimately represents unwavering determination. Overcoming adversity, he built the Niagara Falls power plant, showcasing the potential of AC power. His perseverance and belief in his vision continue to inspire generations, urging us to pursue our dreams and make a lasting impact on the world.

Marie Curie

Curie's most notable achievements include her groundbreaking research on radioactivity, which led to the discovery of two elements, polonium and radium. Her work not only revolutionized our understanding of atomic structure but also laid the foundation for modern nuclear physics. In her own words "Nothing in life is to be feared, it is only to be understood" shouting to the world that determination, courage, and an inquisitive mind are the forces that drive us forward.

In 1903 Curie became the first woman to be awarded the Nobel Prize, jointly recognized with her husband Pierre Curie and physicist Henri Becquerel. This historic achievement shattered gender barriers and showcased the remarkable intellect and contributions of women in the scientific community.

Marie Curie's remarkable journey serves as an inspiration to all, transcending gender and societal norms and reminding us that no matter one's gender, race or background one can aspire to greatness.

Thomas Edison

Edison's significant works include the invention of the phonograph, the practical electric light bulb, and the motion picture camera. These inventions revolutionized communication, lighting, and entertainment, shaping the course of modern civilization.

One of Edison's famous quotes, "Genius is one percent inspiration and ninety-nine percent perspiration," embodies his belief in the importance of hard work and perseverance. It serves as a reminder that true brilliance is not simply a stroke of luck but the result of relentless effort and determination.

A few moments in history had so much impact on the world as the moment that Edison demonstrated the first practical electric light bulb. This groundbreaking achievement illuminated the world, replacing gas lamps and transforming the way we live, work, and interact. It symbolized Edison's unyielding spirit of innovation and highlighted his ability to transform visionary ideas into tangible realities through hard work and determination.

INVENTORS

Rudolf Diesel

Rudolf Diesel revolutionized transportation with his groundbreaking creation, the diesel engine. His relentless pursuit of efficiency and commitment to innovation continue to inspire generations, shaping the landscape of modern transportation and power generation.

Diesel's engine maximized fuel efficiency and power, transforming industries worldwide. His famous quote "The engine is the heart of an airplane, but the pilot is its soul," reflects his understanding that technology alone cannot achieve greatness. He recognized the essential role of human ingenuity and skill in harnessing the potential of his invention, underscoring the importance of human touch and innovation in driving progress.

In 1897 in the engine factory of Maschinenfabrik Augsburg, where Diesel had been working tirelessly to develop his innovative engine design. Surrounded by a small group of engineers and industry experts, Diesel unveiled his creation, igniting the engine for the first time, after that the world was never the same.

Count Alessandro Volta

Volta's important works include the invention of the electric battery, known as the Voltaic pile, which unlocked the ability to produce a continuous flow of electrical current. This groundbreaking creation laid the foundation for the development of numerous electrical devices and power systems that have transformed our world.

One of Volta's famous quotes, "The language of science is universal, and its results are unambiguous and objective," emphasizes his belief in the universal nature of scientific knowledge. It serves as a reminder that science transcends borders and biases, offering a shared language to explore the wonders of the natural world.

Volta demonstrated his Voltaic pile to Napoleon Bonaparte in 1801. This electrifying encounter showcased the immense potential of Volta's invention, capturing the attention of the great ruler and garnering admiration and recognition from the scientific community.

Michael Faraday

Faraday's work laid the foundation for modern power generation and electric technology. His experiments and groundbreaking research paved the way for countless advancements in the field of physics and transformed the way we harness and utilize electrical energy.

Faraday discovered electromagnetic induction in 1831 and through a series of ingenious experiments, he demonstrated that a changing magnetic field could induce an electric current in a nearby wire. This groundbreaking revelation unlocked the potential for generating electricity from magnetism, leading to the development of generators and transformers that power our modern world.

Believing that: "Nothing is too wonderful to be true if it be consistent with the laws of nature," he revolutionized our understanding of electricity and magnetism and his life serves as a reminder to embrace the wonders of the natural world and push the boundaries of knowledge, constantly seeking new truths.

Heinrich Hertz

Hertz's greatest contribution to science includes the experimental confirmation of James Clerk Maxwell's theory of electromagnetism. He successfully demonstrated the existence and properties of electromagnetic waves, paving the way for the development of wireless communication systems that have transformed the world.

His famous quote "I do not think that the wireless waves I have discovered will have any practical application," reflects his humble nature and underestimation of the profound impact of his own work. It serves as a reminder to embrace the unexpected and the seemingly impossible, for within them lie the seeds of revolutionary breakthroughs.

INVENTORS

The Wright Brothers

Wilbur and Orville, soar as legends in the realm of aviation, forever etching their names in the skies. Through force of will, innovation, and an unyielding dream, they defied gravity and paved the way for humanity's conquest of the heavens.

They designed and constructed the world's first successful airplane, the Wright Flyer. Through countless experiments and iterations, they mastered the art of controlled, powered flight and on December 17, 1903, in Kitty Hawk, North Carolina. Against the backdrop of rolling sand dunes, the Wright Brothers achieved the unimaginable—the first powered flight. As the world watched in awe, they defied gravity, soaring through the air for 12 seconds, forever changing the course of human history.

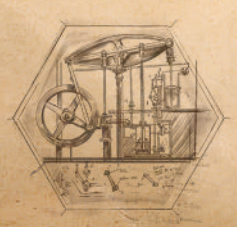
Their quote, "If we worked on the assumption that what is accepted as true is really true, then there would be little hope for advance," encapsulates their unwavering determination to challenge the status quo. It serves as a reminder to question the limits of what is believed possible and push beyond the boundaries of conventional wisdom.

Alexander Graham Bell

Bell's innovative design and relentless pursuit of improving sound transmission propelled him to the forefront of technological advancements, setting the stage for the modern era of telecommunications.

On March 10, 1876, when he uttered the famous words, "Mr. Watson, come here, I want to see you," through a strange device marked the first successful telephone call ever made. In that instant, the world shrank, as distances were bridged and voices carried across great expanses, forever changing the way we connect with one another.

Bell's quote "Before anything else, preparation is the key to success," encapsulates his belief in the importance of thorough preparation and dedication. It serves as a reminder that great achievements are often the result of meticulous planning and unwavering commitment to one's goals.



Charles Wheatstone

Charles Wheatstone left an indelible mark on the world of communications and electrical engineering. Through his ingenious creations and relentless pursuit of knowledge, he opened new pathways of understanding and laid the groundwork for modern technologies.

His most important work was the Wheatstone bridge, a circuit that revolutionized the measurement of electrical resistance. This breakthrough not only paved the way for precise measurements in electrical engineering but also found applications in fields such as telecommunications and instrumentation.

In 1837 he and his colleague William Fothergill Cooke demonstrated the first practical electric telegraph. With a successful public demonstration between two points in London, they showcased the immense potential of their invention, forever changing the way people communicated over long distances.

Benjamin Franklin

Benjamin Franklin, a polymath and founding father of the United States, illuminates the annals of history with his remarkable achievements and unwavering commitment to knowledge and progress. His multifaceted contributions have left an indelible impact on science, literature, diplomacy, and the very fabric of American society. With the invention of the lightning rod, he revolutionized the understanding and protection against the destructive power of lightning. Franklin's innovative design not only safeguarded countless lives and properties but also laid the foundation for modern electrical safety measures.

One of Franklin's famous quotes, "An investment in knowledge pays the best interest." encapsulates his belief in the transformative power of education and lifelong learning. It serves as a reminder that intellectual curiosity and continuous self-improvement are the keys to personal and societal progress.

In 1752 when he famously conducted his kite experiment to prove the electrical nature of lightning. Braving the elements, he flew a kite with a key attached, demonstrating the connection between lightning and electricity. This bold act of scientific exploration not only expanded our understanding of the natural world but also solidified Franklin's place as a pioneer in the field of electricity.

INVENTORS

Samuel Colt

Samuel Colt, a visionary inventor, and entrepreneur, blazes a trail through history with his pioneering contributions to firearms technology. His most notable invention, the Colt revolver was a groundbreaking firearm that revolutionized personal protection and combat. With his innovative revolving cylinder design, Colt introduced a new era of rapid-fire capability, empowering individuals with unprecedented firepower and changing the course of military tactics.

His trademark slogan "God created men and Samuel Colt made them equal." encapsulates the notion that the Colt revolver leveled the playing field, granting individuals from all walks of life the means to defend themselves and assert their independence.

Colt unveiled his iconic revolver, the Colt Paterson, to the world in 1836. With its flawless design and exceptional performance Colt ignited a legacy that would endure for generations, propelling his name to become synonymous with innovation and reliability in firearms.

Henry Ford

Henry Ford, a visionary industrialist and automobile magnate, holds a legendary status in the realm of innovation and entrepreneurship. Ford's vision was to make automobiles affordable for the masses. That led him to the development of the assembly line manufacturing process, enabling the efficient production of vehicles on a large scale, and on October 1st, 1908, he succeeded in his vision with the creation of Ford Model T. With this invention he brought mobility and freedom to countless individuals, transforming the way people lived, worked, and traveled.

Ford believed in the power of mindset and self-belief as shown from his famous quote "Whether you think you can, or you think you can't – you're right." that serves as a reminder that our thoughts and attitudes shape our reality and that success is often born from a determined and positive mindset.

Samuel Morse

In May 24, 1844, Samuel Morse sent the first telegraph message from Washington, D.C., to Baltimore. The iconic message read, "What hath God wrought," marked a pivotal moment in the history of communication, demonstrating the effectiveness and practicality of Morse's telegraph system. It heralded a new era of communication, shrinking distances and connecting people in ways previously unimaginable.

Working with Alfred Vail, Samuel Morse developed the Morse code, a simple yet powerful system of dots and dashes that allowed messages to be encoded and decoded effortlessly. His inventions revolutionized global communication, laying the foundation for future advancements in telecommunications. Morse's legacy serves as a reminder that a single idea, fueled by determination and creativity, can transform the world and bridge the gaps that divide us, fostering connectivity and understanding.

Ferdinand von Zeppelin

ICount Ferdinand von Zeppelin soared to great heights with his remarkable creation: the Zeppelin airship. His unwavering passion for aviation and relentless pursuit of innovation forever changed the way we traverse the skies.

It was on July 2, 1900, that his magnum opus made its first successful maiden flight. The LZ-1, commonly known as Zepelin, was a groundbreaking achievement that showcased the viability and potential of Zeppelin's invention, captivating the world's imagination and setting the stage for further advancements in aviation.

His quote, " The forces of nature cannot be eliminated but they may be balanced one against the other." reflects his way of thinking that nature and science must work together to achieve the best results.

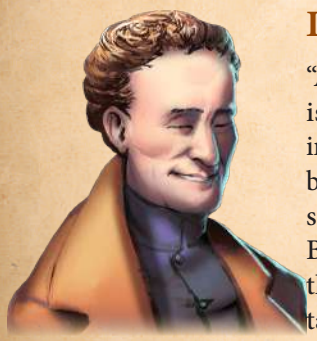
INVENTORS

James Watt

James Watt's ingenuity and perseverance transformed the world of steam power and his remarkable contributions revolutionized industry, transportation, and laid the foundation for modern-day power systems. Thus, making him one of the most influential figures of the Industrial Revolution.

His unwavering dedication and passion for his work is reflected in his quote "I can think of nothing else but this machine.". It highlights his single-minded focus and commitment to perfecting the steam engine, exemplifying the mindset of a true innovator.

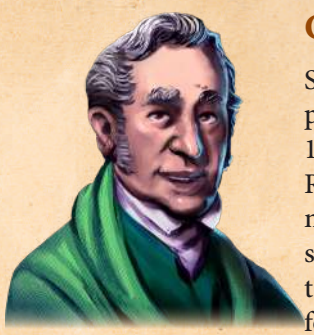
One evening, while working as an instrument maker in Glasgow on a model of a Newcomen steam engine, Watt encountered a problem that seemed unsolvable; how to make the steam engine more efficient. Inspired by the steam rising from a nearby teapot, Watt envisioned a separate condenser that could cool the steam without affecting the main cylinder, thus preventing energy loss. A story that highlights how world changing achievements can come from the simplest of observations.



Louis Braille

"Access to communication in the widest sense is access to knowledge, and that is vitally important for us if we [the blind] are not to go on being despised or patronized by condescending sighted people." perfectly encapsulates Louis Braille life and achievements. It was this belief that led him to develop the Braille system, a tactile writing system that enables blind and visually impaired individuals to read and write. Braille's ingenious combination of raised dots representing letters and numbers opened up a world of literacy and independence for the visually impaired community, fostering equal access to education, information, and communication.

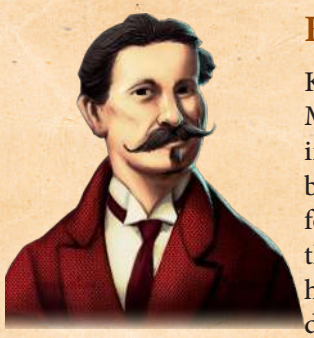
Braille became a true symbol of the blind community when in 1824 unveiled his tactile writing system at the Royal Institute for Blind Youth in Paris. This pivotal moment marked the beginning of a transformative journey that would transcend borders and languages, enriching the lives of millions of visually impaired people for decades to come.



George Stephenson

Stephenson solidified his position as a pioneering figure in steam locomotion in 1829, when his invention the "Rocket" won the Rainhill Trial. This triumphant achievement marked a turning point in railway history, showcasing the potential of steam power to revolutionize transportation and lay the foundation for the modern railway system we know today.

Stephenson's legacy serves as a reminder that with determination, ingenuity, and a passion for pushing boundaries, one can pave the way for extraordinary achievements that transform the world. " As he said, "Where combination is possible, competition is impossible."



Karl Benz

Karl Benz patented the Benz Patent-Motorwagen, the first practical automobile, in 1886. This remarkable feat marked the birth of the modern automobile, laying the foundation for the transportation revolution that would follow. Benz's invention showcased his engineering brilliance and led to the development of automobiles that would revolutionize the world.

True to his words, "The love of inventing never dies." Benz's unwavering dedication to pushing the boundaries of what was possible revolutionized the automobile industry and paved the way for all future breakthroughs in his field.

William Austin Burt

Burt's revolutionary device, the typewriter, automated the process of writing and sparked a revolution in the workspace as it enabled faster and more accurate record keeping. His invention set the stage for future advancements in writing technology, playing a pivotal role in the evolution of communication.

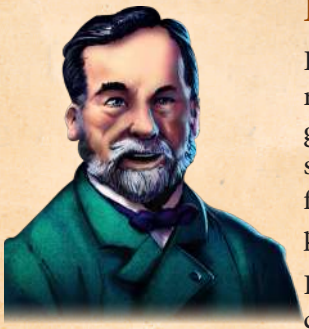
He always believed that there was something worthwhile discovering even in the most unlikely events. "Look around and see what you can find." is a quote that solidifies this belief and what ultimately led him to discover the iron ore deposits that fueled much of American industrialization in the 19th and 20th centuries.

INVENTORS

Charles Goodyear

Charles Goodyear was a tenacious and innovative inventor who left an indelible mark on the world with his groundbreaking contributions to the field of rubber. His tireless pursuit of perfection and unwavering determination led to the discovery of the process of vulcanization. This technique revolutionized the rubber industry, paving the way for the manufacturing of countless rubber products that we rely on today.

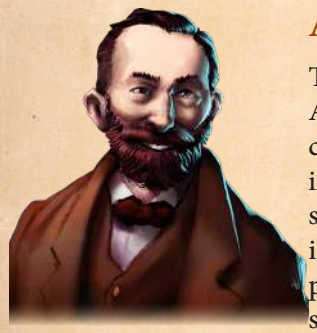
"I am not disposed to complain that I have planted, and others have gathered the fruits." these words show his true love of science and innovation as he puts his personal gain second to the technological and scientific advancement of humanity.



Louis Pasteur

Pasteur's development of pasteurization revolutionized the preservation of perishable goods, ensuring safer consumption and longer shelf life. His innovative approach set the foundation for modern food safety practices, protecting countless lives.

He was a firm believer that the intersection of curiosity and preparedness lead to greatness. His quote "Fortune favors the prepared mind." serves as a reminder that scientific breakthroughs emerge when one is open to new possibilities and equipped with knowledge and expertise. Pasteur's unwavering dedication to scientific inquiry and his ability to seize opportunities inspire us to embrace curiosity and remain steadfast in our pursuits.



Alfred Nobel

The visionary inventor and philanthropist, Alfred Nobel, left an enduring legacy that continues to shape our world. Renowned for his invention of dynamite, Nobel's contributions to science and technology revolutionized various industries. However, it is his dedication to promoting peace and humanitarianism that sets him apart as a truly inspiring figure.

Although his most important work was the invention of dynamite, he wanted to be remembered for the establishment of the Nobel Prize and not for the invention of dynamite that brought as much suffering in war as economic prosperity through building and mining applications in times of peace. So, in 1895 he signed his will, outlining his intention to establish the Nobel Prize. Transforming his legacy and making his name synonymous with scientific breakthroughs and the pursuit of peace.

His quote, "If I have a thousand ideas and only one turns out to be good, I am satisfied." reveals his relentless pursuit of innovation and his acceptance of failure as a natural part of the creative process. A quote that continues to inspire individuals across the globe to push the boundaries of human achievement and strive for a better, more harmonious world.

INVENTIONS

Lightning Rod

The invention of the lightning rod by Benjamin Franklin in 1752 marked a significant milestone in scientific exploration. Driven by his insatiable curiosity, Franklin conducted daring experiments to understand the nature of lightning. Through meticulous observations and deductive reasoning, he conceived the idea of a lightning rod—a conductive metal rod attached to buildings to safely redirect lightning strikes. Franklin's innovative thinking challenged conventional wisdom and revolutionized our understanding of electricity, paving the way for further advancements in the field. His invention not only protected structures from destructive forces but also sparked a new era of scientific inquiry into the mysteries of nature's powerful electrical phenomena.

Spinning Jenny

The invention of the Spinning Jenny by James Hargreaves in the 18th century revolutionized the textile industry and transformed the way yarn was produced. Developed around 1764, the Spinning Jenny allowed a single operator to spin multiple threads simultaneously, vastly increasing productivity and efficiency. Hargreaves' innovative machine played a pivotal role in the Industrial Revolution and the role of women in the workforce fueling the growth of textile manufacturing and contributing to societal advancements.

The Waterframe

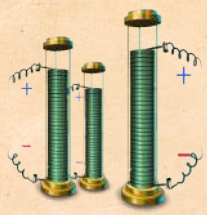
Patented in 1769 by Richard Arkwright, this spinning machine utilized water power to drive multiple spinning frames simultaneously, significantly increasing production efficiency. This invention not only boosted productivity but also spurred economic growth and transformed the textile industry as it allowed the shift from manual labor to mechanized textile manufacturing. The Waterframe's impact on society was profound, fueling advancements in technology, employment, and trade.

Steam Engine

The steam engine is a remarkable invention that laid the foundation for the Industrial Revolution, which emerged in the 18th century. Developed by a series of inventors, including Thomas Savery, Thomas Newcomen, and James Watt, this groundbreaking technology harnessed the power of steam to produce mechanical energy. The steam engine revolutionized industries by enabling the efficient operation of machinery, driving unprecedented advancements in transportation, manufacturing, and agriculture. The steam engine marked a turning point in human history, unleashing a wave of innovation and progress.

Vaccines

The invention of vaccines was a monumental breakthrough in medical science, which dates back to the late 18th century. The pioneering work of Edward Jenner and his development of the smallpox vaccine marked a turning point in disease prevention. Jenner's revolutionary idea stemmed from his observation that milkmaids exposed to cowpox seemed immune to smallpox. Inspired by this, he hypothesized that a milder infection could protect against a more severe one. His thoughts revolved around the power of immunization, using a weakened or inactive form of a pathogen to stimulate the body's immune response and confer protection against future infections. Jenner's groundbreaking work not only laid the foundation for modern vaccination but also opened the door to eradicating deadly diseases and saving countless lives worldwide.



Battery

The invention of the battery, a crucial advancement in the field of electricity, took place in the late 18th century. Alessandro Volta, an Italian physicist, is credited with inventing the first true battery in 1800. Volta's revolutionary device, known as the "Voltaic Pile," provided a continuous flow of electric current by harnessing chemical reactions. His thoughts centered on the potential of this invention to unlock the mysteries of electricity and power various applications. Volta's pioneering work laid the groundwork for modern batteries and their essential role in powering everything from portable devices to electric vehicles, revolutionizing our world and enabling countless technological advancements.

INVENTIONS

Tin Cans

The invention of tin cans, a significant development in food preservation, occurred in the early 19th century. The credit for this breakthrough goes to Peter Durand, who patented the process in 1810. Durand's visionary thinking was driven by the need for a reliable and convenient method to preserve food for longer durations, especially for military and maritime purposes. His invention involved sealing food within airtight tin containers, preventing spoilage and extending its shelf life. Durand's innovation revolutionized the food industry, enabling widespread access to preserved food, improving nutrition, and paving the way for modern canning techniques that continue to benefit us today.

Mechanical Reaper

Cyrus McCormick, an American inventor, introduced the first practical mechanical reaper in 1831. McCormick's visionary thoughts were driven by a desire to improve the efficiency of harvesting crops, reducing manual labor and increasing productivity. His invention featured a cutting mechanism powered by a horse or steam engine, enabling farmers to harvest crops more quickly and efficiently. The mechanical reaper revolutionized agriculture, transforming the way crops were harvested and contributing to increased food production. McCormick's invention played a crucial role in the agricultural revolution, providing farmers with the tools they needed to feed growing populations and shaping the future of farming practices worldwide.

First Locomotive

The invention of the first locomotive, a groundbreaking advancement in transportation, occurred in the early 19th century. George Stephenson, an English engineer, is widely credited with developing the " The Blücher" in 1814. Stephenson's visionary thoughts centered around harnessing steam power to propel a vehicle on iron tracks, revolutionizing transportation and opening new possibilities for trade and travel. His pioneering locomotive marked the birth of the railway era, setting the stage for the rapid expansion of railways worldwide. Stephenson's invention laid the foundation for modern railway systems, connecting cities, fostering economic growth, and bringing people closer together, ultimately transforming the world's landscape of transportation.

Morse Code

The invention of the Morse Code revolutionized communication in the 19th century. Samuel Morse, an American inventor, and his collaborator Alfred Vail developed the code in 1836. Driven by a desire to transmit messages quickly and efficiently over long distances, Morse conceived a system using dots and dashes to represent letters and numbers. His system allowed for rapid communication, especially during telegraphy, revolutionizing long-distance communication and laying the foundation for modern-day telecommunications. Morse code became a universal language, connecting people across vast distances and transcending barriers of time and space. Morse's ingenuity forever changed the way we communicate, bridging gaps and fostering connectivity in an increasingly interconnected world.

Stethoscope

The invention of this revolutionary medical tool took place in the early 19th century. René Laennec, a French physician, introduced the first stethoscope in 1816. Driven by a desire to enhance his diagnostic capabilities, Laennec conceived the idea of a device that could amplify and transmit the sounds of the human body. His invention involved a simple hollow tube, enabling doctors to listen to internal body sounds with clarity and precision. Laennec's groundbreaking innovation transformed the field of auscultation, enabling physicians to diagnose and monitor various diseases of the heart, lungs, and other vital organs. The stethoscope became an emblem of the medical profession, empowering doctors to better understand their patients' health and saving countless lives through early detection and accurate diagnoses.

First Revolver

Samuel Colt, an American inventor, patented the Colt revolver in 1836. Colt's visionary thoughts were driven by a desire to create a firearm that offered rapid-fire capability and increased firepower. His invention featured a rotating cylinder holding multiple rounds, enabling quick and reliable firing without the need for reloading after each shot. The first revolver revolutionized personal defense and military tactics, enhancing the efficiency and effectiveness of firearms in various applications. Colt's innovative design became the foundation for modern revolver technology, leaving an indelible mark on the history of firearms and forever changing the landscape of combat and self-defense.

INVENTIONS

Sewing Machine

Isaac Singer, motivated by a vision to revolutionize the art of sewing, invented the sewing machine in 1851. His invention featured a mechanized system that automated the stitching process, allowing for faster and more precise sewing. The sewing machine transformed the textile industry, empowering individuals and businesses to create garments with greater speed and precision. Singer's innovative thinking laid the foundation for modern sewing machines, enabling the realization of intricate designs and fueling the growth of the fashion industry.

Corn Picker

The invention of the corn picker was a significant development in agricultural technology, which occurred in the early 20th century. Edmund Quincy, an American inventor, is credited with inventing the first corn picker in 1850. Many iterations later, the first mechanical corn picker was introduced in 1909, and by the 1920s one- and two-row pickers powered by tractor engines were becoming popular. What all these inventions had in common was that they featured mechanical components that could efficiently harvest corn ears from the stalks, reducing manual labor and increasing yields. The corn picker revolutionized the agricultural industry, enabling farmers to streamline their operations and meet the growing demands for food production.and fueling the growth of the fashion industry.

Aspirin

Many scientists attempted to isolate and purify alkaloids from natural sources. After unsuccessful attempts by the Italian chemists Brugnatelli and Fontana in 1826, Johann Buchner obtained relatively pure salicin crystals, a precursor to aspirin, from willow bark in 1828. Ultimately in 1897 Felix Hoffmann used salicylic acid refluxed with acetic anhydride to synthesize acetylsalicylic acid, the active ingredient of aspirin. Hoffmann aimed to develop a medication that could relieve pain and reduce inflammation. Aspirin soon gained popularity for its remarkable effectiveness in alleviating various ailments and its widespread use revolutionized the treatment of pain, fever, and inflammatory conditions, contributing to improved quality of life for countless individuals worldwide.

Hay Cultivator

In the realm of agricultural innovation, the invention of the hay cultivator stands as a testament to human ingenuity and the pursuit of efficiency. Developed in the late 19th century, with notable advancements made by John Froelich in 1892, the first gasoline/petrol-powered hay cultivator revolutionized the process of harvesting and managing hay crops. Its design and functionality allowed for improved productivity, reducing labor-intensive efforts and increasing overall crop yields. The hay cultivator enabled farmers to work smarter, not harder, transforming the way hay was cultivated and improved the lives of million farmers around the world.

Pasteurization

Developed by Louis Pasteur in the 19th century, pasteurization is a process of heating liquids, such as milk and wine, to specific temperatures to kill harmful microorganisms without compromising taste or quality. This groundbreaking method, introduced between 1862 and 1864, revolutionized the preservation of perishable foods and beverages, extending their shelf life and ensuring public health. Pasteur's innovative thinking and commitment to scientific research led to this transformative technique, forever changing the landscape of food production and safety.

Machine Gun

In the Paris Exhibition of 1881, a man told Maxim that if he wanted to make a fortune, he should invent a machine that would help the Europeans kill each other. That dark seed flowered into the invention that has reshaped the course of history and revolutionized warfare. The first practical machine gun, known as the Maxim gun, was patented by Hiram Maxim in 1884. With its rapid-fire capabilities and devastating firepower, the machine gun forever altered the dynamics of warfare, leading to new strategies and tactics on the battlefield.

INVENTIONS

Torpedo

The first self-propelled torpedo was developed and perfected by Robert Whitehead in 1866. Whitehead's innovative creation utilized compressed air propulsion and sophisticated guidance systems, allowing the torpedo to navigate its own path towards its target with remarkable precision. With its ability to strike from below the water's surface, the torpedo offered a new level of strategic advantage and naval superiority. Whitehead's vision to create a weapon that could decisively impact naval battles transformed the face of naval warfare forever.

Dynamite

The invention of dynamite by Alfred Nobel in 1867 brought about a monumental shift in the field of explosives. Nobel's creation, a stable and powerful explosive, revolutionized construction, mining, and demolition industries. With its controlled and predictable detonation, dynamite enabled unprecedented levels of precision and safety in various applications. Nobel's thoughts were driven by a desire to develop an explosive that would bring greater efficiency and safety to the industry. Although Nobel's noble intentions, dynamite eventually found its way into the hands of individuals with malicious intent. Its destructive power made it a weapon of choice for warfare and acts of violence. Nobel, deeply affected by the destructive potential of his invention, established the Nobel Prizes as a way to promote peace and amend his legacy.

Crop Rotation

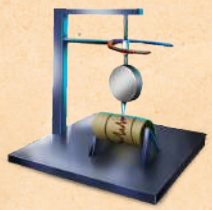
Its origins can be traced back to ancient civilizations, with evidence of its implementation dating as far back as 6000 BCE. Insightful farmers in ancient Greece, Rome and China, aware of the depleting effects of mono-cropping, devised a system of rotating crops to maintain soil fertility and minimize disease outbreaks. In modern times this visionary approach was refined into science by agricultural scientists such as George Washington Carver. These new techniques allowed for increased productivity and healthier crops, allowing much larger yields needed to feed the fast-developing world of the 19th and 20th century.

Telephone

With the invention of the telephone in 1876 Alexander Graham Bell marked a monumental leap forward in communication technology. Through his extensive research and experimentation, Bell realized the potential of transmitting sound over long distances using electrical signals. On that fateful day, Bell uttered the famous words, "Mr. Watson, come here. I want to see you." and the first successful telephone call was made. Bell's vision of connecting people across vast distances became a reality, revolutionizing global communication forever and instantly making the world smaller.

Lightbulb

Long before Thomas Edison patented, first in 1879 and then a year later in 1880, and began commercializing his incandescent light bulb, British inventors were demonstrating that electric light was possible with the arc lamp. Ultimately, Edison's relentless pursuit for a practical electric lighting solution led to the development of a filament that could glow for extended periods. But Edison didn't stop with improving the lightbulb and commercializing it, he went on to develop a whole suite of inventions that made the use of lightbulbs practical Thus the lightbulb became a symbol of enlightenment and progress, illuminating cities, homes, and minds.



Seismograph

The basic problem in measuring earthquakes is to attain a steady point that remains fixed when the ground moves. The simplest way to achieve this is a pendulum in which a heavy mass is suspended by a wire or rod from a fixed point. Many designs managed to create such an environment and became the first primitive seismographs. Following a large earthquake in the Yokohama area of Japan in 1880, Milne invented the first modern horizontal pendulum seismograph to measure and record earthquakes. With its precise and sensitive design, the seismograph allowed for the accurate measurement and recording of seismic activity thus revolutionizing the study of geology and seismological effects as well as saving lives by predicted potential seismogenic activity.

INVENTIONS

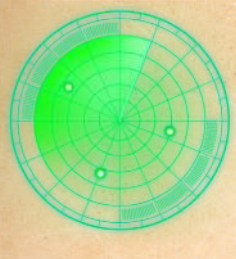
First Car

The first stationary gasoline engine developed by Karl Benz was a one-cylinder two-stroke unit which ran for the first time on New Year's Eve 1879. Seven years later, in 1886, Karl Benz marked a groundbreaking achievement in the realm of transportation when he applied for a patent for his "vehicle powered by a gas engine." Thus officialy creating the first automobile. With its innovative design and combustion engine, Benz's automobile transformed the way people traveled and paved the way for the future of automotive engineering.

Diesel Engine

After years of experimentation and refinement, Diesel patented his revolutionary engine design in 1892.

The diesel engine introduced a groundbreaking concept: compression ignition. By compressing air in the cylinder to a high temperature, the fuel injected into the chamber would ignite spontaneously, eliminating the need for spark plugs. This innovation resulted in significantly improved efficiency and fuel economy compared to existing engines.



Radar

The radar is a radiolocation system that uses radio waves to determine the distance (ranging), angle (azimuth), and radial velocity of objects relative to the site. It detects and tracks aircraft, ships, spacecraft, guided missiles, and motor vehicles, and maps weather formation and terrain. The term RADAR was coined in 1940 by the United States Navy as an acronym for radio detection and ranging. The invention of radar started with Heinrich Hertz in 1886 who showed that radio waves could be reflected from solid objects and was later perfected during the second world war as a need for predicting enemy airstrikes, submarines and warships.

Radioactivity

When Henri Becquerel investigated the newly discovered X-rays in 1896, he discovered by accident that uranium salts spontaneously emit penetrating radiation that can be registered on a photographic plate. Building upon Becquerel's findings, Marie Curie and her husband Pierre Curie extensively researched this mysterious radiation. Their tireless efforts led to the discovery of new radioactive elements, such as polonium and radium, and coined the term "radioactivity" to describe the spontaneous emission of radiation. Marie Curie's pioneering research in radioactivity earned her the distinction of being the first woman to win a Nobel Prize and the only person to receive Nobel Prizes in multiple scientific fields.

Fluorescent Lighting

In the early 20th century, researchers such as Peter Cooper Hewitt and Nikola Tesla conducted pioneering work in the field of gas-discharge lamps, which laid the foundation for fluorescent lighting. However, it was in mid-1970 that significant advancements were made by a team of scientists at General Electric. Edward Hammer developed the first compact fluorescent light by figuring out how to bend the fluorescent tube into a spiral shape, thus developing the first commercially available and practical design.

Zeppelin

The first successful flight of a Zeppelin airship took place on July 2, 1900. Count Zeppelin's unwavering determination and meticulous design led to the creation of a rigid airship that relied on an internal framework of metal girders to maintain its shape. The use of hydrogen gas for buoyancy, coupled with powerful engines, enabled these airships to achieve impressive speeds and long-distance flights.

INVENTIONS

X-Ray

The discovery of X-rays revolutionized the field of medical imaging and opened a window into the invisible realm of the human body. In 1895, German physicist Wilhelm Conrad Roentgen made a serendipitous breakthrough while experimenting with cathode rays. He noticed a mysterious glow emitting from a nearby fluorescent screen when a cathode ray tube was energized. Curiosity led Roentgen to investigate further, and he discovered that these newly discovered rays had the ability to pass through many substances, including human flesh, while leaving an impression on photographic plates. Fascinated by their mysterious properties, he named them "X-rays" due to their enigmatic nature.

$E=mc^2$

Published in 1905, Einstein's special theory of relativity proposed that the laws of physics are the same for all observers in uniform motion. The equation $E=mc^2$ emerged as a consequence of this theory, expressing the equivalence of energy (E) and mass (m) multiplied by the speed of light squared (c^2). This equation signifies that energy and mass are interchangeable, with mass possessing an inherent energy content even when at rest. It revealed the immense amount of energy contained within even a small amount of mass, paving the way for breakthroughs in nuclear physics and energy production.

Assembly Line

It was Henry Ford, the American industrialist and founder of Ford Motor Company, who revolutionized the manufacturing process with this groundbreaking innovation. In 1913, Ford introduced the world to the first moving assembly line for automobile production. By breaking down the complex process of building a car into a series of smaller, specialized tasks, Ford dramatically increased efficiency and productivity. Workers stationed along the assembly line would focus on a specific task, allowing for rapid and standardized production.

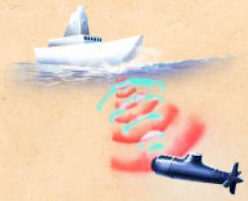
Audion

In 1906, Lee de Forest introduced the Audion, an improved version of the existing vacuum tube technology. The Audion featured a third electrode, known as the grid, which allowed for the amplification and control of electric signals. This breakthrough innovation transformed the field of telecommunications, enabling the amplification and manipulation of audio signals. Audion became the foundation for numerous advancements in electronic technology, including the development of radio broadcasting, telephony, and eventually, the creation of computers.

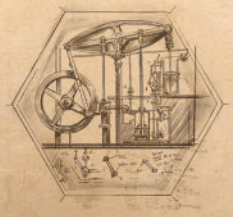
The Flying Machine

In the early 20th century, after years of study, experimentation, and countless hours of trial and error, the Wright brothers, Orville and Wilbur, successfully achieved powered, controlled, and sustained flight. On December 17, 1903, near Kitty Hawk, North Carolina, their aircraft, the Wright Flyer, took to the skies and covered a distance of 120 feet in 12 seconds. This was the first ever mechanical flight in human history and paved the way for modern aviation and opened a new era of human exploration and transportation.

Sonar



Sonar, short for Sound Navigation and Ranging, works by emitting sound waves into the water and measuring the time it takes for the sound to bounce off underwater objects and return to the sensor. By analyzing the echoes, it is possible to determine the distance, direction, and characteristics of underwater targets. The development of sonar can be traced back to the early 20th century, with significant contributions from multiple scientists and engineers.



INVENTIONS

Antibiotics

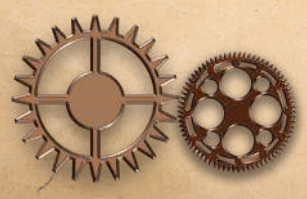
The story of antibiotics spans several decades and involves numerous scientists and researchers who made groundbreaking contributions. One of the most significant milestones in the history of antibiotics was the discovery of penicillin by Scottish biologist Alexander Fleming in 1928. Fleming accidentally stumbled upon the mold Penicillium notatum, which produced a substance that inhibited the growth of bacteria. This chance discovery laid the foundation for the development of the first antibiotic. Building upon Fleming's work, Howard Florey and Ernst Chain, along with their team, successfully purified and produced penicillin in large quantities during the early 1940s.

Helicopter

In the early 20th century, various inventors, engineers, and aviators experimented with vertical flight. However, it was Igor Sikorsky, a Russian-American aviation engineer, who made a breakthrough with the creation of the Vought-Sikorsky VS-300, the first successful single-rotor helicopter to achieve controlled flight. On September 14, 1939, the VS-300 made its maiden flight, demonstrating the feasibility and potential of helicopters.

Tank

The concept of an armored vehicle capable of traversing difficult terrains and providing cover for soldiers originated during World War I. British engineer and inventor Sir Ernest Swinton, along with Sir William Tritton, an expert in agricultural machinery played crucial roles in the development of the first practical tank. In 1915, they collaborated to create the Mark I tank, which was used in combat for the first time during the Battle of the Somme in 1916.



Stainless Steel

The invention and development of stainless steel can be attributed to multiple scientists and engineers over several decades. In 1913, English metallurgist Harry Brearley is often credited with the discovery of "rustless steel", as he called it, while working on developing erosion-resistant materials for gun barrels. He found that adding chromium to steel significantly improved its resistance to rust and corrosion. In later years, several scientists explored different compositions and refining techniques to enhance the properties of stainless steel, making it more suitable for various applications.

Radio Circuit

One of the key figures in the invention of the radio circuit was Guglielmo Marconi. In the late 19th century, Marconi conducted experiments and built upon the discoveries of James Clerk Maxwell and Heinrich Hertz to develop practical wireless telegraphy systems. Marconi successfully demonstrated the transmission of radio signals across the Atlantic Ocean in 1901, marking a significant milestone in long-distance wireless communication. The development of radio circuits continued with advancements in components such as capacitors, inductors, and tuning mechanisms. The introduction of solid-state electronics, transistors, and integrated circuits further revolutionized radio circuitry, enabling smaller, more efficient, and versatile radio devices.

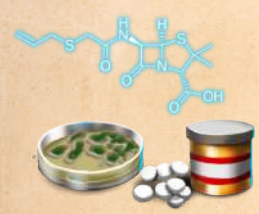
Insulin

The discovery of insulin revolutionized the treatment of diabetes, providing a life-saving therapy for individuals with this chronic condition. In the early 20th century, Canadian physician Frederick Banting and his research assistant Charles Best inspired by previous research on the pancreas, conducted experiments in 1921 at the University of Toronto and successfully extract insulin from pancreatic tissues, leading to the treatment of diabetes in animals. Building on this initial success, Banting and Best collaborated with pharmaceutical company Eli Lilly and Company to refine the insulin extraction process and produce sufficient quantities for human use. In 1922, they administered the first successful insulin injection to a young boy suffering from severe diabetes.

INVENTIONS

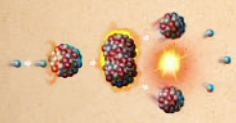
Rockets

The invention of rockets marks a significant milestone in human history, propelling us beyond the confines of Earth's surface and opening the doors to space exploration. The Chinese invention of gunpowder in the 9th century laid the foundation for the creation of the first rudimentary rocket-like devices called "fire arrows" or "fire tubes." The first real rockets were developed in the mid-20th century with the development of the V-2 rocket by German engineer Wernher von Braun during World War II. The V-2 was the world's first long-range guided ballistic missile, serving as a precursor to the future exploration of space. Following the war, von Braun and other German scientists immigrated to the United States, working with NASA revolutionized the human spaceflight program.



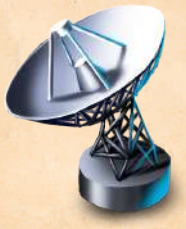
Penicillin

The discovery of penicillin represents a groundbreaking achievement in the field of medicine, revolutionizing the treatment of bacterial infections and saving countless lives. In 1928 Dr. Alexander Fleming returned from a holiday to find mold growing on a Petri dish of Staphylococcus bacteria. He noticed that the mold seemed to be preventing the bacteria around it from growing and identified that the mold produced a self-defense chemical that could kill bacteria. It wasn't until a decade later, in the early 1940s, that the true potential of penicillin was realized. Scientists Howard Florey and Ernst Chain further investigated Fleming's discovery and successfully purified penicillin to a usable form.



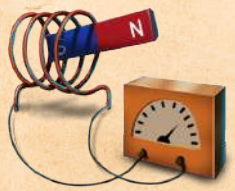
Nuclear Fission

The discovery and development of nuclear fission unleashed a new era of scientific understanding and harnessed the immense power stored within the atom. The practical application of nuclear fission was realized through the Manhattan Project, a top-secret research endeavor during World War II. Led by American physicist J. Robert Oppenheimer, the project resulted in the successful construction and detonation of the first atomic bomb, the Trinity nuclear test, on July 16, 1945. The harnessing of nuclear fission for peaceful purposes also led to the development of nuclear power plants, which generate electricity by utilizing the heat produced from controlled nuclear fission reactions.



Radio Systems

Radio is the technology of signaling and communicating using radio waves. Radio waves are generated by an electronic device called a transmitter connected to an antenna that radiates the waves and is received by another antenna connected to a radio receiver. Radio is widely used in modern technology, in radio communication, radar, radio navigation, remote control, remote sensing, and other applications. Visionary scientists such as James Clerk Maxwell, Heinrich Hertz, and Guglielmo Marconi laid the groundwork for the invention and advancement of radio systems.



Electromagnetic Conduction

Electromagnetic conduction is a fundamental phenomenon that underlies the transmission of electrical energy and information through various materials. The groundwork for the study of electromagnetism was established by notable figures such as Michael Faraday and James Clerk Maxwell in the 19th century. Faraday's experiments and Maxwell's equations provided a theoretical framework for understanding the relationship between electricity and magnetism. Edison, Tesla, and other scientists advanced the field in the 20th century. Today, electromagnetic Conduction plays a crucial role in telecommunications, power systems, electronics, and computing. It enables data transmission through cables, fiber-optic networks, and wireless communication.

Computer

The invention of the computer is a remarkable journey that spans several decades and transformed the very fabric of society. One crucial milestone was the development of the Electronic Numerical Integrator and Computer (ENIAC) in 1945 by J. Presper Eckert and John W. Mauchly. The invention of the transistor by John Bardeen, Walter Brattain, and William Shockley in 1947 further accelerated computer technology. The introduction of microprocessors in the 1970s, particularly by Intel, revolutionized computing, leading to the rise of personal computers in the 1980s. Today, computers continue to evolve rapidly, with advancements in areas like artificial intelligence, cloud computing, and quantum computing.

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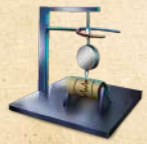

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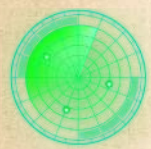

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