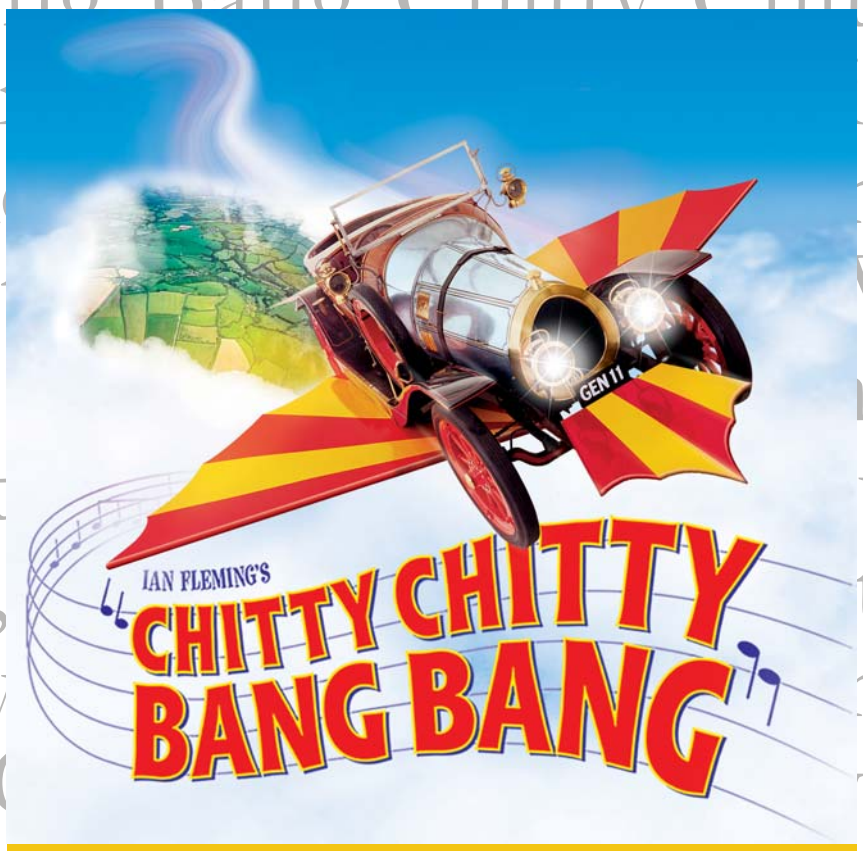
Chitty Chitty Bang Bang



A STUDY GUIDE

by Peter Royston

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The creators of the *CHITTY CHITTY BANG BANG* Study Guide

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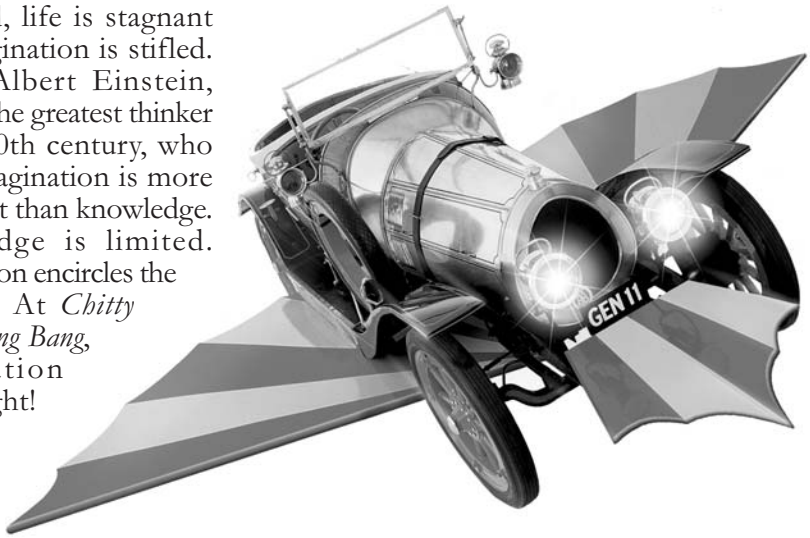
“Nothing ever built arose to touch the skies unless some man dreamed it should, some man believed that it could, and some man willed that it must…”

– Charles F. Kettering, inventor

WELCOME!

Buckle your seatbelts and get ready for the ride of your life! Welcome to *Chitty Chitty Bang Bang*, the most fantasmagorical musical in the history of everything!

Beyond its wonderful score, breathtaking special effects and extraordinary characters, *Chitty Chitty Bang Bang* is about invention, about inspiration, about seeing the world through the eyes of a child. The eccentric inventor Caractacus Potts and his family can see the potential in a rundown old racecar, transforming it into a flying and swimming thing of magic. Standing against them is Baron Bomburst, tyrannical ruler of Vulgaria, where children are outlawed, life is stagnant and imagination is stifled. It was Albert Einstein, perhaps the greatest thinker of the 20th century, who said “Imagination is more important than knowledge. Knowledge is limited. Imagination encircles the world." At *Chitty Chitty Bang Bang*, imagination takes flight!



What do inventors and theatre artists have in common? They both take us on journeys of the imagination, expanding our definitions of what is possible. This study guide for *Chitty Chitty Bang Bang* will take educators, students and families on that journey: exploring the history of invention, the mind of inventors, and the use of inventive thinking to bring the world of *Chitty Chitty Bang Bang* to life on stage. This guide includes background information, worksheets and games designed to expand a young person’s curiosity and thirst for knowledge.

The essential idea behind *Chitty Chitty Bang Bang* is one that all educators share: the importance of nurturing imagination and creativity. A child who will look on the world like Caractacus Potts – as a magical place of possibility – will grow up to be the inventor who gives us life-saving machines, moving poetry, or words that bring people together. Or as the author Ray Bradbury said, “Touch a scientist and you touch a child."

welcome!

MEET THE CHARACTERS!

CHITTY CHITTY BANG BANG: The magical, fantasmagorical car!

CARACTACUS POTTS: An eccentric, brilliant, English inventor

JEREMY & JEMIMA POTTS: His children

GRANDPA POTTS: His father, a former war hero. Also named Caractacus.

TRULY SCRUMPTIOUS: Daughter of the famous candy maker, Lord Scrumptious, Truly is a whiz at mechanics

LORD SCRUMPTIOUS: Owner of the Scrumptious Sweet Factory

PHILLIPS: Receptionist at the Scrumptious Sweet Factory

MR. COGGINS: Owner of Coggins Junkyard

BARON BOMBURST: Tyrannical ruler of Vulgaria, a lover of toys

BARONESS BOMBURST: Head of the Vulgarian Parliament, a hater of children

BORIS & GORAN: Two Vulgarian spies

THE CHILDCATCHER: He makes sure that Vulgaria is child-free (or so he thinks!)

THE TOYMAKER: With all children outlawed in Vulgaria, this toy-making genius only works for the child-like Baron

VIOLET & SID: An English couple who meet Caractacus at the Fairgrounds

A TURKEY FARMER: A farmer who finds a new use for one of Caractacus' inventions

EMPLOYEES AT THE SCRUMPTIOUS SWEET FACTORY

INVENTORS, PRISONERS OF BARON BOMBURST

TOBY: A Vulgarian child

ENGLISH CITIZENS, VULGARIAN CHILDREN, CITIZENS & SOLDIERS

Costume sketches from *Chitty Chitty Bang Bang* by Anthony Ward

THE STORY

ACT ONE

The scene is Mr. Coggins' Junkyard. As the story begins, Mr. Coggins is describing the last race of a great racecar ("There Never Was a Car"). The English car was the star of her day, but she met her end during the British Grand Prix of 1910, when the Vulgarians sabotaged her. Now she is a lonely wreck, with only two children, Jeremy and Jemima, to care for her. The children have come to love the old car, and they are shocked when Coggins tells them he must sell it. He promises them that if they can raise 40 shillings, they can have the car. Meanwhile, Truly Scrumptious has arrived at the junkyard, searching for a part for her motorcycle. She is distressed to see the two children out of school. As they leave, two Vulgarian spies enter. They have been searching for the legendary car for years and are determined to get it before the children.

Truly takes the children home and meets their father, Caractacus Potts. The Potts' family lives in an old windmill. Potts shows Truly his many amazing inventions, including a new type of candy. Truly and Potts argue about how he is raising the children, and she leaves. Potts and the children prepare to eat ("I Have You Two"). Jeremy and Jemima tell their father about Coggins' offer to sell the car, and he promises them he will try. Grandpa tries the new candy his son has invented and realizes that it can make a beautiful whistling sound.

The next day, Potts and the children pay a visit to the Scrumptious Sweet Factory, trying to sell his new candy, which he calls Toot Sweets. They run into Truly, who tries to get her father, Lord Scrumptious, to buy it ("Toot Sweets"). The candy-maker tries one, blowing on its whistle, which causes dozens of wild dogs to invade the factory. Potts and his family make a hasty retreat.

Meanwhile, the two spies have raised the money to buy the car, but they realize that Coggins will never sell it to two Vulgarians. They decide to disguise themselves as Englishmen ("Act English").

Back at the windmill, Potts is more determined than ever to buy the car for his children. He sings them a lullaby ("Hushabye Mountain"), then takes one of his inventions, an automatic haircutting machine, to a local fair. There he meets Violet and her boyfriend, Sid. The machine cuts all of Sid's hair off and he is furious! Potts tries to make his escape and gets caught up in some dancers getting ready to perform. ("Me Ol' Bamboo")

Luckily for Potts, he runs into a Turkey Farmer, who wants to use his haircutting machine to pluck and cook turkeys. Potts finally gets his 40 shillings and is able to buy the car.

Potts sets to work fixing the car while Grandpa and the children keep the house in order ("Posh"). The two spies lurk in the shadows, waiting for their moment to pounce.

Finally, Potts is finished. Truly arrives and they all admire the gleaming car, which they name Chitty Chitty Bang Bang after the sound she makes ("Chitty Chitty Bang Bang"). They decide to go on a picnic at the seaside. Once there, Jeremy and Jemima tell Truly that they love her, and she confesses that she cares for them as well ("Truly Scrumptious").

As the children sleep, Caractacus and Truly begin to realize that they have feelings for each other. Distracted, they don't realize that the tide has come in and surrounded the car. And if that wasn't bad enough, a Vulgarian ship begins to fire on them! Suddenly Chitty begins to transform into a boat-car, and they are able to escape their pursuers. Learning that Chitty can float on the water makes Baron Bomburst want the car even more.

CONTINUED

THE STORY (continued)

Back at the windmill, thinking that Grandpa is the inventor they are looking for, the Vulgarians kidnap Grandpa by lifting him up in his hut with a large hook attached to an airship. Caractacus, Truly and the children speed after them, not realizing they are heading straight for a cliff. As they plummet to the ground, Chitty grows wings and takes flight to Vulgaria in pursuit of Grandpa!

ACT TWO

The Vulgarian air ship deposits Grandpa in the Vulgarian town square. Still believing that Grandpa is a brilliant inventor, Baron Bomburst orders him, on pain of death, to make his car float and fly. Grandpa meets six inventors who have been prisoners of the Baron for years. Grandpa despairs, but the inventors tell him that nothing is impossible ("The Roses of Success")

Caractacus, Truly and the children arrive in Vulgaria, secretly searching for Grandpa. The Toymaker brings them into his shop just in time, for the Childcatcher appears, sniffing the air for the thing the Baroness has banned from all Vulgaria – children! ("The Childcatcher's Song")

The Toymaker shows Potts where the people of Vulgaria have hidden their children – underground, in the sewers. At the toyshop, the Childcatcher tricks Truly and takes Jeremy and Jemima.

In the sewers, Potts is determined not only rescue his children and Grandpa, but to put an end to the misery of Vulgaria ("Teamwork Can Make a Dream Work").

The scene shifts to the Baron and the Baroness as they prepare for the Baron's birthday party ("Little Choochie Face"), and the Baroness describes her grand plans for the festivities ("The Bombie Samba").

At the Baron's party, the Toymaker nervously brings out his latest toys: two life-sized dolls. As they spring to life and begin to sing, we realize they are Truly and Caractacus in disguise ("What Do You See?"). As the court is distracted by their performance, the army of children appears.

Will they win over the forces of Vulgaria? Will the Baron and Baroness be defeated? Will Grandpa be rescued? With teamwork, imagination and the help of a magical car, *Chitty Chitty Bang Bang* flies, swims and rides to a breathtaking finale!

"OH! YOU! PRETTY CHITTY BANG BANG
CHITTY CHITTY BANG BANG WE LOVE YOU
AND OUR PRETTY CHITTY BANG BANG
CHITTY CHITTY BANG BANG LOVES US TOO
HIGH LOW, ANYWHERE WE GO
ON CHITTY CHITTY WE DEPEND
BANG BANG CHITTY CHITTY BANG BANG
OUR FINE FOUR FENDERED FRIEND
BANG BANG CHITTY CHITTY BANG BANG
OUR FINE FOUR FENDERED FRIEND."

- from *Chitty Chitty Bang Bang*

English/Language Arts

"The fairest thing we can experience is the mysterious. It is the fundamental emotion which stands at the cradle of true art and true science. He who knows it not and can no longer wonder, no longer feel amazement, is as good as dead, a snuffed-out candle."

– Albert Einstein

IAN FLEMING:

The "Inventor" of Chitty Chitty Bang Bang

BACKGROUND INFO

How is a writer like an inventor?
They both have restless minds!

Photo of Ian Fleming reproduced with the permission of the Estate of Ian Fleming

Like the brilliant inventor he created in his novel, *Chitty Chitty Bang Bang*, Ian Fleming was full of life and a lover of adventure. He could never keep still. As a matter of fact, he began to write *Chitty Chitty Bang Bang* from his hospital bed, recuperating from a heart attack!

Born in England in 1908, Ian Lancaster Fleming is best known today as the creator of the super secret agent, James Bond, codenamed 007. Between 1952 and 1964, he employed his own experiences as a Commander of British Intelligence during World War II to write 14 thrillers about Bond, which have sold more than 72 million copies around the world and been made into 19 feature films.

Chitty Chitty Bang Bang began as a bedtime story Fleming had told his son, Caspar. Fleming spun the tale, about a magical car that shoots across the water like a speedboat or flies through the heavens like a jet, from pure imagination, but it was based on truth. He based the "character" of Chitty Chitty Bang Bang, on two real-life cars: a car he had owned as a young man that had been wrecked in an accident with a train (with Ian inside!) and a racing car built by an eccentric driver named Count Zborowski called Chitty Bang Bang, which Fleming had seen in the 1920s.

At the age of 53, while recovering from a heart attack, Fleming began putting his fantastic tale down on paper. *Chitty Chitty Bang Bang* shares many elements with the Bond books: wild adventure, heroes, evil villains, and, most of all, a love of the imagination. As Fleming writes, "some motorcars – mine, for instance, and perhaps yours – are different. If you get to like them and understand them…you will find, you MAY find, that they become almost like persons – MORE than just ordinary persons – MAGICAL PERSONS!!!"

"Never say 'no' to adventures. Always say 'yes,' otherwise you'll lead a very dull life."

- from CHITTY CHITTY BANG BANG
by **Ian Fleming**

FROM THE PAGE TO THE SCREEN TO THE STAGE

How is a film maker like an inventor? They're both problem solvers!

Albert "Cubby" Broccoli had a problem. As the producer of the first 17 James Bond films, it was only natural that he and his company, Eon Productions, should bring Ian Fleming's *Chitty Chitty Bang Bang* to the screen. But how do you give a flying and swimming car the reality that a film requires? How do you bring Ian Fleming's vision to life?

As they sing in *Chitty Chitty Bang Bang*, "Teamwork can make a Dream Work." Broccoli gathered a group of highly acclaimed artists from around the world. Fleming had died in 1964, so director Ken Hughes teamed with the writer Roald Dahl to fashion the screenplay (see box). Songwriters Richard and Robert Sherman were brought on board to write the songs after winning an Academy Award for their score for the film *Mary Poppins* in 1964. After starring in his own highly popular TV series, along with his role as Bert in *Mary Poppins*, Dick Van Dyke took on the role of Caractacus Potts, and Broadway and West End actress Sally Ann Howe played Truly Scrumptious.

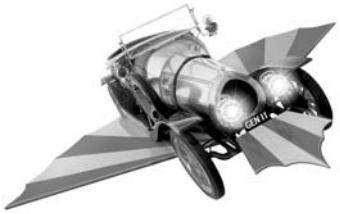
More James Bond connections: Desmond Llewellyn who played Q, James Bond's weapons master, took the role of Mr. Coggins and Gert Frobe, who played the evil Bond villain Goldfinger, took another "bad guy" role as Baron Bomburst!

It fell to Ken Adam, the designer for seven Bond films, to bring the magical car to life. Teaming with Roland Emmett, he created an actually running car that was 17 feet long and weighed 2 tons. Filmed in England, Germany and France, this now-classic film musical premiered in December of 1968. At the time, it was one of the most expensive films ever produced, and Broccoli always said, of all his films, *Chitty Chitty Bang Bang* made him most proud.

Now, Eon Productions takes on the "problem" of bringing this magical story to life on stage, right in front of an audience. To do this, the producers have borrowed Broccoli's solution: gather the best artists from all around the world, and always keep Ian Fleming's adventurous dreams in mind.

ROALD DAHL

When Albert Broccoli was looking for a writer to help Ian Fleming's dreams take flight on film, it's no wonder he looked to Roald Dahl. Best known as the writer of children's books like *James and the Giant Peach* and *Charlie and the Chocolate Factory,* Dahl had another connection with Fleming: he had written the screenplay to the James Bond Film, *You Only Live Twice.* Dahl's biting wit and exaggerated style were a perfect match for *Chitty Chitty Bang Bang.* Dahl was no stranger to magical machinery: during World War II, he coined the term "gremlin," those mythical creatures that lurked in airplane engines and always made them fail just at the wrong time!



CRACK CARACTACUS' CODE Part 1

Baron Bomburst has kidnapped **Caractacus Potts** and his family! Now Potts is trying to get word to **Chitty Chitty Bang Bang** through secret coded messages!

The first message tells Chitty where they are. Using the names of people found in this study guide, write the circled letters in the spaces to find the name of the country where Potts and his family are being held.

1. **This actor played Caractacus Potts in the movie version.**

   ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___

2. **Albert Brocolli's nickname**

   "___ ___ ___ ___ ___"

3. **The original "inventor" of** *Chitty Chitty Bang Bang*

   ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___

4. **The choreographer of the** *Chitty Chitty Bang Bang* **musical**

   ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___

5. **Set and Costume Designer for the** *Chitty Chitty Bang Bang* **musical**

   ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___

6. **Caractacus Potts' son**

   ___ ___ ___ ___ ___ ___ ___

7. **Owner of the Junkyard in** *Chitty Chitty Bang Bang*

   Mr. ___ ___ ___ ___ ___ ___ ___

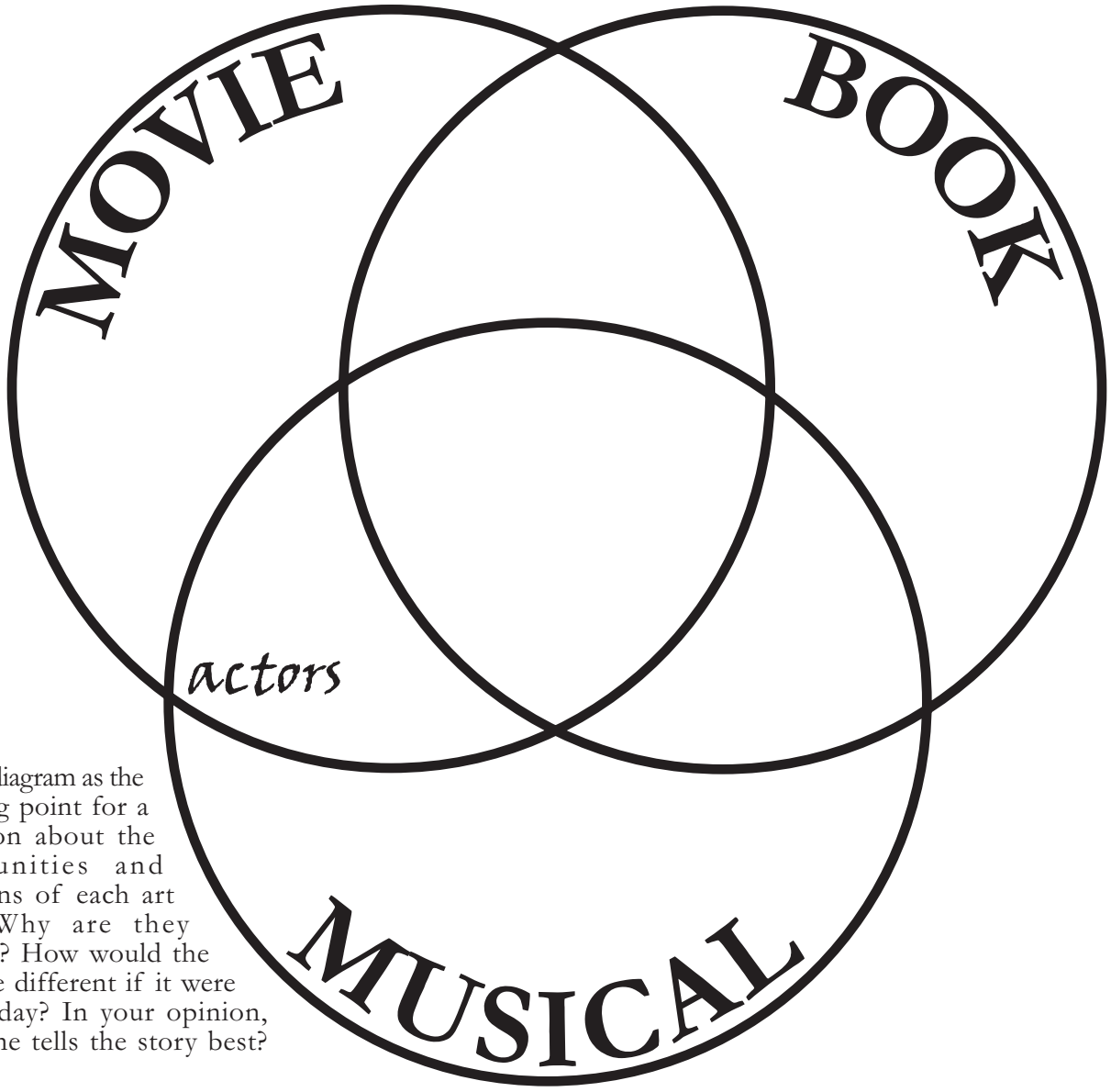
8. **Family name of composer/lyricist team for** *Chitty Chitty Bang Bang*

   ___ ___ ___ ___ ___ ___ ___

answer on page 39

MOVIE vs. BOOK vs. MUSICAL

How do different art forms approach the same story? *Chitty Chitty Bang Bang* is that rare tale that has been adapted into a variety of art forms: a novel, a live feature film, and now a stage musical. How are these art forms different? How do their opportunities and their limitations dictate how the story can be told? If you can, read the book, see the movie and experience the musical versions of *Chitty Chitty Bang Bang*. Use the Venn Diagram below to compare these three different versions of the same story. Where are they different? Where are they the same?



Use this diagram as the launching point for a discussion about the opportunities and limitations of each art form. Why are they different? How would the movie be different if it were made today? In your opinion, which one tells the story best?

A WORD ABOUT WORDS

WHAT'S IN A NAME?

What's in a name? In *Chitty Chitty Bang Bang*, quite a lot! Both Ian Fleming in the original novel, and then Roald Dahl and Ken Hughes in the screenplay to the movie, use characters names to tell the audience about their personalities. The name "**Caractacus Potts**" can be shortened to the phrase, "Crack Pot" a slang phrase for an eccentric person. The name **Truly Scrumptious** is, of course, the perfect name for a candy-maker's daughter, and who but the explosive **Baron Bomburst** could rule a vulgar country like Vulgaria?

Can you think of new names for these three characters? Be sure the names you create give your readers clues about the characters' personalities!

PERSONIFICATION

Giving an inanimate, or non-living, thing the qualities of a human being is called **personification**. People often do this with machines of transportation like cars or ships. Sailors always call a ship "she" or "her," even if it has a masculine name like the USS Abraham Lincoln. The writer E.B. White wrote this about his first car: "I can still feel my old Ford nuzzling me at the curb, as though looking for an apple in my pocket."

FANTASMAGORICAL NEW WORDS:

In the lyrics to the song "Chitty Chitty Bang Bang," the Sherman Brothers (see page 31) create new words to describe how Potts, Truly and the children feel about their magical car, never-before-heard words like "uncategorical," "fantasmagorical," "spectaculous" and "fantabulous." By creating these fun, inventive new words, what quality do the Sherman Brothers give to this song? After listening to the song, write five standard words describing the emotions you hear in the song. Then make up five of your own words describing the song. Read your words to a partner – is it clear what you mean?

"I'm sure we would never have had men on the Moon if it had not been for Wells and Verne and the people who wrote about this and made people think about it."

- Science fiction author Arthur C. Clarke

What If?

Today we take inventions like the personal computer, the Internet, the cell phone or even the electric light for granted; they seem like a natural part of our everyday life. But to someone 1000 years ago, or even 50 years ago, they would have seemed almost like magic, something from a tale of the fantastic…

Or a science fiction story! The 19th and 20th centuries saw a new literary genre: science fiction, in which writers like H.G. Wells and Jules Verne used their vivid imaginations to predict possible futures of technology and science.

Now it's your turn. Use the space below to brainstorm on this idea:

In the future, what if everyone owned a car that flies and swims???

List 3 ways your life would be different. Be specific!:

1. _____
2. _____
3. _____

How would it make life better?

1. _____
2. _____
3. _____

How would it make life more dangerous?

1. _____
2. _____
3. _____

CREATE AN ADVERTISING CAMPAIGN

Inventions don't just appear in your home magically; they must be advertised and sold. Advertising agencies create a special language to describe new inventions in order to tempt consumers to buy them. In 1878, the Edison phonograph (great-grandfather of the CD player) was called the "acoustical marvel of the century…By the simple turning of the crank, the machine talks, sings, shouts, laughs, whistles, and coughs, so naturally and distinctly that the listener can hardly believe his senses."

Imagine that you are an advertising agent and Caractacus Potts comes to you with his new invention: Toot Sweets, the whistling candy. Design an advertising campaign to sell this new candy to the public.

Brainstorm

Brainstorm five words to describe this new candy, each one highlighting a different aspect of the treat:

1. _____
2. _____
3. _____
4. _____
5. _____

How do Toot Sweets appeal to the senses? Using your five words above in any combination you wish, write one sentence describing how this new candy sensation tempts each of your five senses:

SIGHT: _____

HEARING: _____

SMELL: _____

TOUCH: _____

TASTE: _____

Using these sentences, write a paragraph, or "copy," for a radio commercial about Toot Sweets. Your main point: how will Toot Sweets improve your life?

_____

_____

_____

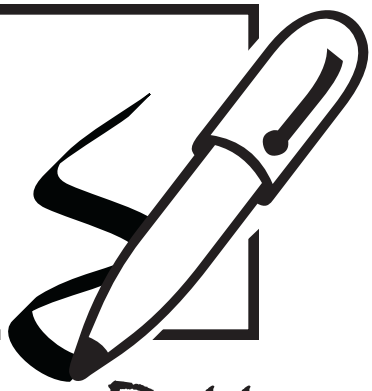
_____

_____

Using all the information you have gathered, create your own poster, commercial, or jingle about Toots Sweets. Be unique – remember, your goal is to make the public NEED that candy!

DIARIES

How do different characters see the same event? From the viewpoint of Caractacus Potts and Baron Bomburst, write a diary entry describing the arrival of Chitty Chitty Bang Bang to Vulgaria. How does this event make the two characters feel? What do the characters want? How do these emotions affect the characters' language?



From the desk of Caractacus Potts

Dear Diary:

This morning Chitty Chitty Bang Bang arrived in Vulgaria!

From the desk of Baron Bomburst

Dear Diary:

This morning Chitty Chitty Bang Bang arrived in Vulgaria!

FICTIONAL BIOGRAPHIES

A biography is the detailed life story of a historical figure. But can you write the biography of a fictional character? Give it a try with the characters from *Chitty Chitty Bang Bang*. Choose one of the main characters from the list on page 4 as the subject of your biography. Use these charts to graph out your information before you begin.

Costume sketches by Anthony Ward

one STEP 1: WHAT WE KNOW

Your main source of information on your character is *Chitty Chitty Bang Bang* itself. After seeing the show, write a list of "facts" about your character: what have you learned about the character from seeing the show. Be prepared to explain where in the show you learned each "fact." These "facts" can include age, physical appearance, likes and dislikes, family members, political views, musical tastes, etc.

WHAT I KNOW ABOUT _____	HOW I LEARNED THIS "FACT"
1.	1.
2.	2.
3.	3.
4.	4.
5.	5.

two STEP 2: WHAT WE CAN INFER

When we *infer* an idea, we come to an educated conclusion based on facts we already know. For example, if you see smoke in the distance, you can *infer* that there is probably some type of fire. What can we infer about the characters in *Chitty Chitty Bang Bang,* based on the facts we already know? Remember, inferences are not guesses, but educated deductions based on facts. So your inferences can take in what you have learned about Ian Fleming, inventors and inventive thinking, and the creation of the *Chitty Chitty Bang Bang* movie and musical.

FACTS ABOUT _____	WHAT I INFER	WHY?
1.	1.	1.
2.	2.	2.
3.	3.	3.
4.	4.	4.
5.	5.	5.

three

STEP 3: WHAT WE CAN IMAGINE

Finally, after gathering facts and making inferences, we are left with what we can imagine, or make up, about our characters. In biographies of historical figures, imagining facts or events is usually frowned upon, but in the research and discovery process, a good imagination is essential to a biographer. When dealing with fictional characters, the sky's the limit – up to a point. You can fill out your biography of a *Chitty Chitty Bang Bang* character with ideas you imagine, but remember, they have to make sense, they have to logically fit the facts and inferences you have already gathered.

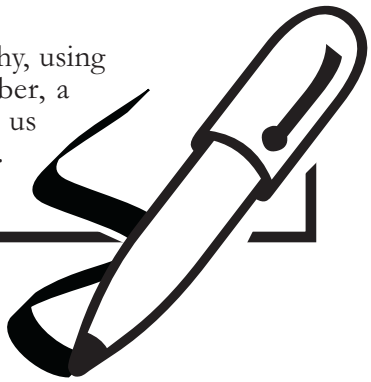
Here are some ideas for imagined facts or events:

- **What happened to Jeremy and Jemima's mother?**
- **What were some of Grandpa's wartime experiences?**
- **How did Caractacus Potts become interested in inventing?**
- **Does Potts ever sell Toot Sweets to the public?**
- **Why do Baron and Baroness Bomburst hate children so much?**
- **What was the Childcatcher's childhood like?**
- **What happens to the characters after the show ends?**

four

STEP 4: WRITE YOUR BIOGRAPHY

Now that you've gathered your information, create your biography, using prose, poem, play, video documentary or web format. Remember, a biography has to be factual, but also interesting. It has to make us want to know more about the character or historical figure.



"DISASTER DIDN'T STYMIE LOUIS PASTEUR
EDISON TOOK YEARS TO SEE THE LIGHT
ALEXANDER GRAHAM KNEW FAILURE WELL
HE TOOK A LOTTA KNOCKS TO RING THAT BELL
SO WHEN IT GETS DISTRESSING, IT'S A BLESSING
ONWARD AND UPWARD WE MUST PRESS
TIL UP FROM THE ASHES, UP FROM THE ASHES
COME THE ROSES OF SUCCESS."

- from *Chitty Chitty Bang Bang*

Social Studies / History

"Imagination has brought mankind through the dark ages to its present state of civilization. Imagination led Columbus to discover America. Imagination led Franklin to discover electricity. Imagination has given us the steam engine, the telephone, and the automobile, for these things had to be dreamed of before they became realities…The imaginative child will become the imaginative man or woman most apt to invent, and therefore to foster civilization."

– L. Frank Baum, author of *The Wizard of Oz*

THE INVENTION MUSEUM

Want to visit a Museum of Inventions? Go home! Although we take them for granted, our homes are full of inventions. Your bed in the morning? An invention! The alarm clock? Door? Stove? Your house itself? All inventions, all answers to problems that an inventor looked at and said, "Hmmmm. That can be improved!"

Go through your house and make a list of every single invention, that is, every device created by human beings to make life better or help us see things in new ways.

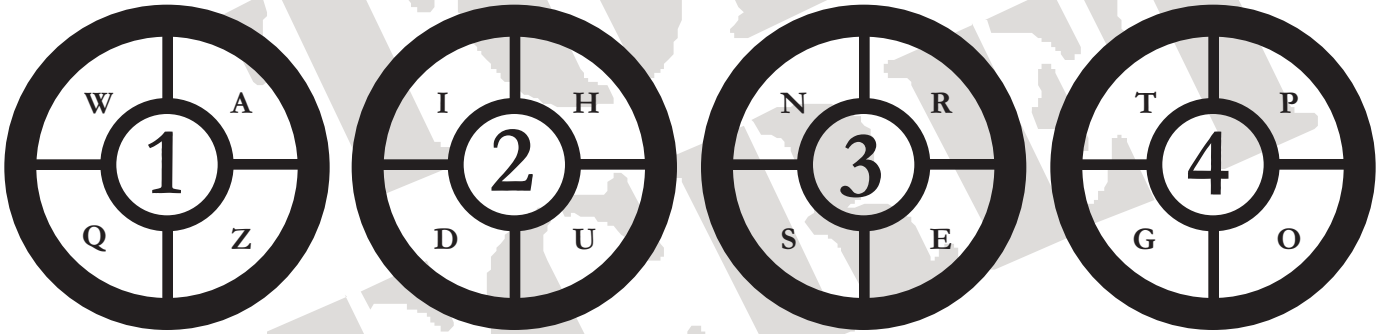
Choose one of the inventions you've found and research its origins. Write a one paragraph description of the invention you've chosen, naming the year or era of its creation, the inventor, how the invention reflected the time in which it was created, and how the invention has evolved over the years. With your classmates, put the inventions you have chosen in chronological order, creating a timeline of everyday miracles.

Brainstorm

OUCH! In *Chitty Chitty Bang Bang*, Caractacus Potts invents a hair-cutting machine that takes a little too much off the top! But Potts wasn't the first one to attempt this. In 1951, John Boax created a machine very similar to Potts' device: a machine worn over the head which would suck the hair up into small holes where electric coils would burn the hair to create the preferred length. Like Potts' machine, Boax's invention was deemed too dangerous!

CRACK CARACTACUS' CODE Part 2

Breaking Potts' code, Chitty has arrived in Vulgaria! Now she must break the second part of the message to find out where Potts and his family are hidden. Fortunately, Potts has hidden the code on Chitty's spare tires! Can you break the code below before it's too late?



answer on page 39

WHO AM I?

Inventors like Caractacus Potts want to change the world. They see problems and want to create, or invent, solutions to those problems. Match the descriptions below with the correct inventor. Look for clues in the descriptions, or type the names into an Internet search-engine:

___ Arthur Fry

___ Georges de Mestral

___ Thomas Sullivan

___ K. Philo Farnsworth

___ Stephanie Kwolek

___ Elijah McCoy

___ Madam C.J. Walker

___ Walter Hunt

___ Clarence Birdseye

___ Benjamin Franklin

answers on page 39

1. In 1849, I was trying to invent a new type of rifle. After three hours of twisting a wire to create a new clasp, I created something I didn't expect, but babies around the world have been thanking me for ever since: the safety pin!

2. When I was a boy, I loved to swim, so I invented special paddles for my hands and feet. Later I invented the lightning rod, the odometer and bifocal glasses.

3. I always dreamed of sending pictures through the air. One day, while plowing a potato field in Rigby Idaho, I conceived of trapping light in an empty jar, and transmitting it---one line at a time---on a magnetically deflected beam of electrons. I was 14 years old. Seven years later I successfully built and demonstrated the first all electronic television system. The year was 1927.

4. In 1904, I sold tea in small silk bags. My customers were sometimes so thirsty, they didn't bother to take the tea out of the bags and just dropped the whole thing into the hot water. I had invented tea bags!

5. The son of runaway slaves, I invented a special lubricating device in 1872 which would oil the gears and pistons of a train while it was still running. When other train workers wanted this special device, they said they needed "the Real McCoy."

6. I was on a trip to Labrador in 1914 when I saw Eskimos freezing their newly-caught fish on the ice. Later, when the fish were cooked, they retained the same taste and texture. From this insight, I developed machinery designed to freeze food and save it for future use.

7. One day in 1948, I was walking in the fields when I saw cockleburs sticking to my pants. I realized that the tiny hooks in the burrs fit exactly with the loops in the cloth of my pants. From this inspiration, I invented Velcro.

8. Working with the DuPont chemical company, I created the fiber Kevlar, an extremely strong and stiff fiber which has saved thousands of lives in use in bulletproof vests.

9. I created an extraordinarily successful line of hair products at the beginning of the 20th century, and became America's first African-American woman millionaire. I said, "I am woman who came from the cotton fields of the South. I was promoted from there to the washtub. Then I was promoted to the cook kitchen, and from there I promoted myself into the business of manufacturing hair goods and preparations."

10. I was frustrated when the slips of paper I placed in the hymnal at church kept falling out. Working with my colleague Spencer Silver at the 3M Corporation, I used a new type of glue that had been deemed a failure because it wasn't sticky enough on the back of little slips of paper. Our invention, Post-It Notes, has swept the world.

WHAT AM I?

What if you had to describe an invention you use every day to someone from Mars?

In *Chitty Chitty Bang Bang*, Caractacus Potts creates many wild and useful inventions, from a breakfast-maker to Chitty herself. Today we are surrounded by inventions that would have seemed almost magical to people a hundred years ago.

How would you describe an invention if you couldn't use its name? Write a few sentences describing each of these every-day inventions. Then try reading them to your classmates and see if they can guess what you mean. Remember, you cannot use any part of the invention's name!

(MIRROR)

(SHOVEL)

(SPIRAL STAIRCASE)

(MICROWAVE OVEN)

(BATHTUB)

(CLOCK)

(DVD PLAYER)

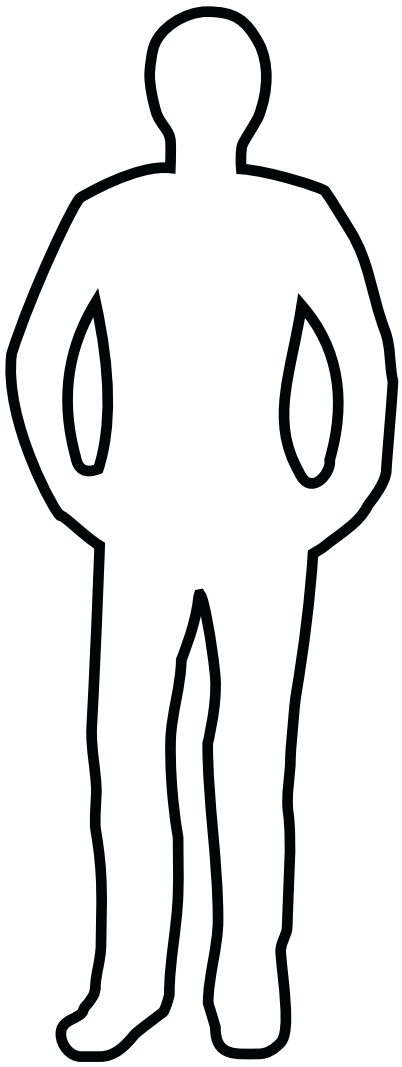
BUILD YOUR OWN INVENTOR

"To invent, you need a good imagination and a pile of junk."

– Thomas Edison

Anyone can build an invention. But building an *inventor*? Here's the way Ian Fleming described his inventor in the novel of *Chitty Chitty Bang Bang*: "their father went through periods of gloom and impatience and frenzy and triumph and dejection and delight and unhappiness and nightmares and loss of appetite…" What qualities or characteristics do you think an inventor should have? Brainstorm 15 evocative words describing your ideal inventor. Then use the outline below to draw a picture of him or her, using your words as a guide.

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____
11. _____
12. _____
13. _____
14. _____
15. _____



"TRULY: And I most certainly did not spend my days playing with junk.

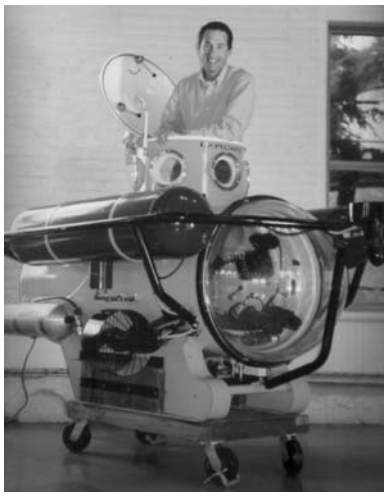
POTTS: Junk?! These are my inventions"

- **from** *Chitty Chitty Bang Bang*

A REAL LIFE CARACTACUS POTTS?

MEET ALAN WINICK!

Building an incredible vehicle from nothing but your imagination and spare parts seems like something out of *Chitty Chitty Bang Bang*, but Alan Winick really did it! The Director of Education at The Discovery Museum in Bridgeport, CT., Alan had always dreamed of building his own submarine. One day, he'd had enough of dreaming, and got to work!



How did you become interested in inventing?

When I was 10 years old, my family moved to Sheepshead Bay, on the southern tip of Brooklyn, NY. The bay and the waterfront were part of my daily life growing up. My friends and I went fishing, swimming, rowing. We had a great time, but all our activities involved only the surface of the water. I was curious about what it was like at the bottom of the bay. By the time I was 12, I was hooked on the idea of building my own submarine. I wasn't satisfied with the idea of waiting until I was an adult. I wanted to build my sub right away, and I told everyone about it. My friends laughed and told me I was crazy, but the grown-ups said something worse: they told me I was just a kid. Of course, they were right. As a kid, I didn't have the knowledge or the funds to build a sub. But I had the dream, and as the years went by I never outgrew that dream. I kept a journal filled with sketches of submarines. At first, they looked like spaceships or racecars, but as I learned more, my drawings started to look like workable submarines.

What are some lessons you've learned as an inventor?

I tried to build my first sub when I was in high school, but was not successful. I think it's important to understand that as an inventor, you can learn as much from your failures as from your successes. It was the failure of my first sub that taught me much of what I needed to know to build my second one, which was a success.

What materials did you use to build your submarine?

I thought about turning all sorts of things into submarines: gas tanks, oil drums, water main pipes, you name it. Anything that could hold air and withstand the pressure of being underwater. You see, I realized that a submarine was basically just a big bubble of air that you could drag underwater. It was as simple, and as complicated, as that. I continued to plan and dream all the way into adulthood. One day, I decided the time had come.

What advice would you give to a young inventor?

I often speak to student groups about my sub and about being an inventor. I always tell them that everyone is an inventor. After all, I don't know anybody who hasn't at one time or another come up with an idea on how to improve something or make life easier in some way. The difference is that the people who call themselves inventors know how to transform their ideas into reality. I think the number one piece of advice for someone who wants to be an inventor is this: Don't give up! Don't expect to simply sit down one day and decide to invent something. You have to keep your eyes, and your mind, open.

Along with his work at the Discovery Museum, Alan runs his own company, DeepSea Schoolhouse, bringing his submarine to schools. Interested in bringing Alan and his sub to your school? Call him at 203-895-3571.

THINK LIKE AN INVENTOR

You don't have to be an inventor in a huge lab surrounded by smoking machines to think inventively. Thinking with the audacious risk-taking of an inventor can help us to solve seemingly impossible problems.

Experts believe that thinking inventively is a three-step process:

1. Identify the problem
2. Identify the solution
3. Create a device, a process or an idea that solves the problem

You might think: isn't that in the wrong order? Identify the solution before you come up with how to solve the problem? This is the secret to thinking like an inventor. Someone like Caractacus Potts always keeps the **goal** in mind; the process leading up to the result is not as important. In *Chitty Chitty Bang Bang*, Potts wanted to build a car; he didn't think it silly to use bits and pieces of machines around the house. The most important thing to him was the goal, and he kept working until he got there.

Here are some ideas on jogging your brain to think inventively.

one STEP 1: RECOGNIZE THE PROBLEM

Write a sentence describing a problem that's always bothered you. It can be something happening in your town or school, or something happening on the world stage. Don't worry if it seems impossible to solve:

_____

_____

_____

two STEP 2: IDENTIFY THE SOLUTION

Now brainstorm five possible solutions to your problem. Again, don't worry if your solutions seem impossible. Remember, one of the prime rules for inventors is that sometimes rules are made to be broken. Don't be afraid to go against the world's assumptions:

1. _____
2. _____
3. _____
4. _____
5. _____

CONTINUED

THINK LIKE AN INVENTOR

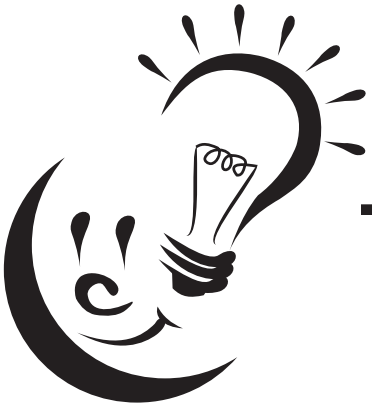
STEP 3: SOLVE THE PROBLEM

three

Choose one possible solution from your list. Keeping your goal in mind, brainstorm ideas on how to reach your target. Brainstorming options:

- Word Association: write out five words associated with your problem
- Look to the past: are there ideas from history you can modify?
- All Natural: are there elements from nature that can help you?

Remember, no idea is too wild or impossible! Get it all down on paper and don't censor yourself. As the science fiction author Ray Bradbury said, "Think before you speak is criticism's motto; speak before you think is creation's..."



WHAT IS A PATENT?

In 1899, Charles H. Duell, Commissioner of the U.S. Patent Office said, "Everything that can be invented, has been invented." Thankfully, he was wrong. The 20th century has turned out to be the most inventive era in history. And behind each new invention is a patent. A patent is recognition from the government that an inventor has created a specific invention. The patent grants an inventor a temporary period (usually seventeen years) in which he or she has complete control, or monopoly, over the invention. Since the U.S. Patent Office was created in 1790, over six million patents have been issued. Today, 70,000 patents are issued every year. With a patent in hand, an inventor has legal recourse if anyone tries to copy his or her invention. To receive a patent, an inventor must show that he or she is the creator of the device, that the device or process is new, and that it is useful.

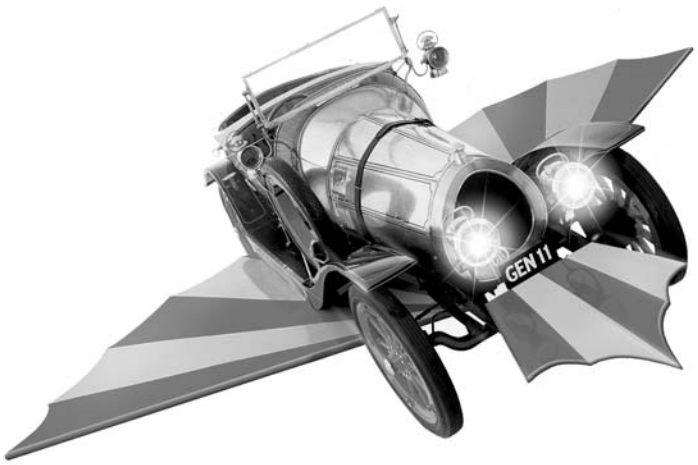
IF WE ALL PITCH IN AND TRY
TEAMWORK CAN MAKE A DREAM WORK
AND NO MOUNTAIN IS TOO HIGH"

-- from *Chitty Chitty Bang Bang*

Music & Theatre

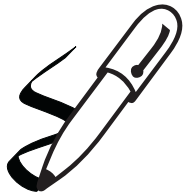
"If I could solve all the problems myself, I would."

– Thomas Edison, when asked why he employs 21 assistants



"We are the music-makers,
We are the dreamers of dreams…"

– Arthur William Edgar O'Shaughnessy



TEST YOUR THEATRE I.Q.

How is an inventor like a theatre artist? They both show us new ways of looking at the world! What's your theatre IQ? Many people work together to create a show like *Chitty Chitty Bang Bang*. Theatre is an art form of collaboration. What are the different jobs needed to put on a show like *Chitty Chitty Bang Bang*? On this page you'll find different members of *Chitty Chitty Bang Bang*'s creative staff: what do you think their jobs are? Write what you think their job descriptions are in the spaces provided. And don't forget the most important part of the equation – you. As an audience member, the show literally cannot go on without you. How can you work with those up on stage and backstage to enhance the experience of the show?

RICHARD M. & ROBERT B. SHERMAN (COMPOSERS & LYRICISTS)

JEREMY SAMS (BOOK WRITER)

ADRIAN NOBLE (DIRECTOR)

GILLIAN LYNNE (CHOREOGRAPHER)

ANTHONY WARD (SET & COSTUME DESIGNER)

MARK HENDERSON (LIGHTING DESIGNER)

ANDREW BRUCE (SOUND DESIGNER)

ALAN WASSER ASSOCIATES (GENERAL MANAGER)

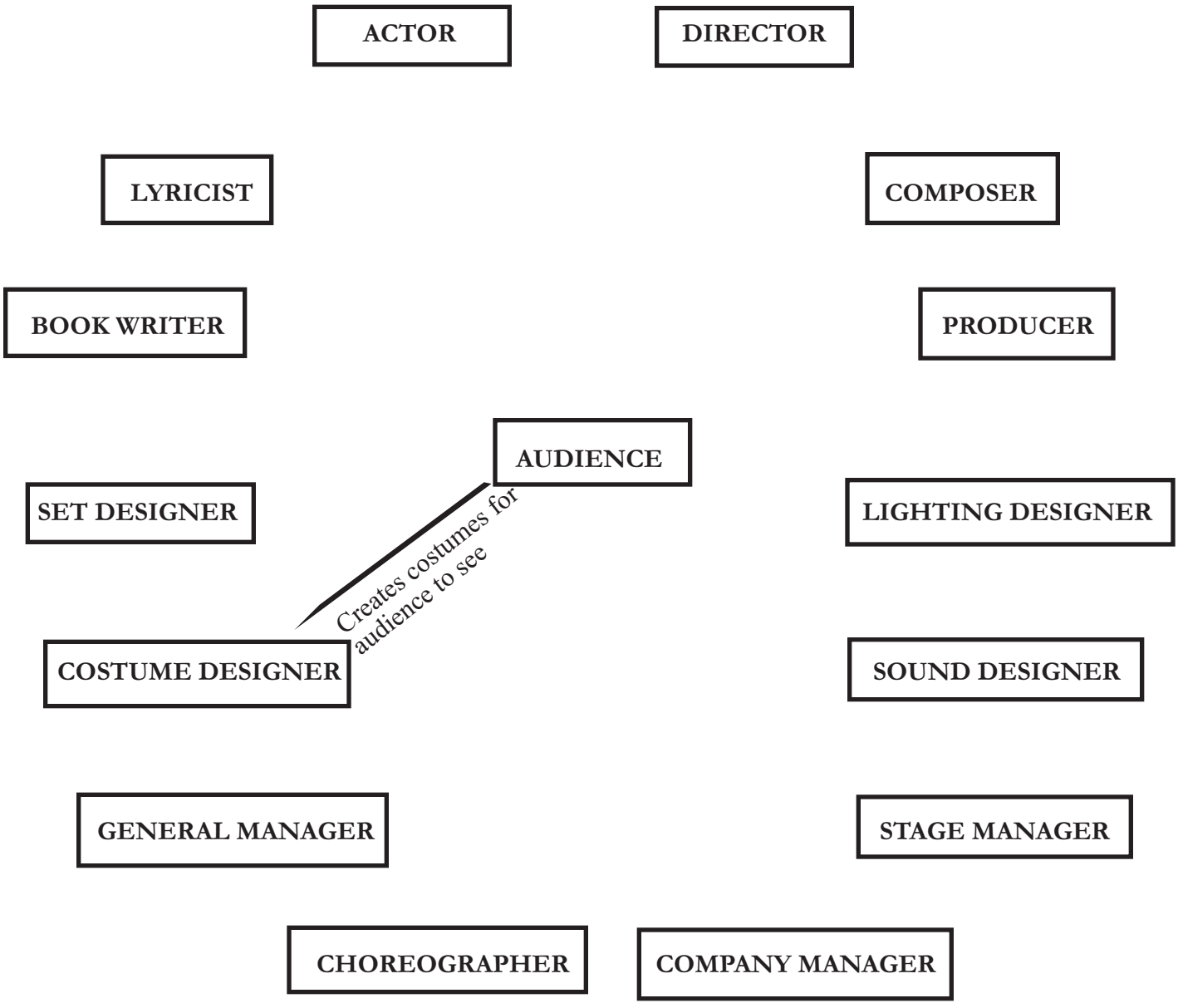
THOMAS SCHLENK (COMPANY MANAGER)

PETER VON MAYRHAUSER (STAGE MANAGER)

BARBARA BROCCOLI (EON)
MICHAEL WILSON (EON)
FREDERICK ZOLLO
NICHOLAS PALEOLOGOS
JEFFREY SINE
MICHAEL ROSE, Ltd.
HARVEY WEINSTEIN
EON PRODUCTIONS (PRODUCERS)

THEATRE CONNECTIONS

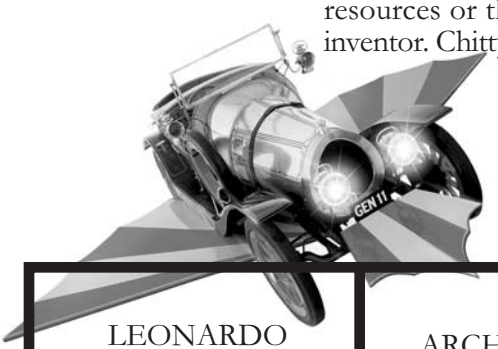
The lyricist Oscar Hammerstein II said that the most important word in theatre is "collaboration." Now that you've identified different jobs in the theatre, can you tell how they collaborate, or work together? Using the map below, draw lines between the theatre jobs, describing how they work together. An example is given for you:



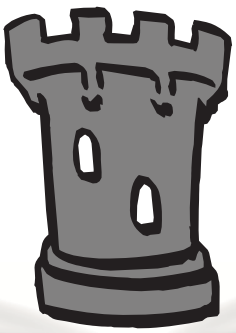
TOP SECRET

CRACK CARACTACUS' CODE Part 3

Chitty's almost there! Caractacus has laid clues throughout the Vulgarian town. Help Chitty find her way through the town! In each row, color in the box with the MOST RECENT inventor, that is, the inventor who lived closest to our time. Use library resources or the Internet to find the dates for each inventor. Chitty's path to the castle will be made clear!



1.	LEONARDO DA VINCI	ARCHIMEDES	DIONYSIUS THE ELDER	HERON
2.	BEN FRANKLIN	DIADES OF PELLA	EMPEDOCLES OF ACRAGAS	PARMENIO OF MACEDONIA
3.	ANTONIE VAN LEEUWENHOEK	DR. EDWARD JENNER	GALILEO GALILEI	CONRAD GESNER
4.	BARTHELEMY THIMONNIER	JOSEPH - NICEPHORE NIEPCE	ORVILLE AND WILBUR WRIGHT	ALEXANDER BAIN
5.	OTTO FREDERICK ROHWEDDER	DR. ALEXANDER FLEMING	GEORGE DE MESTRAL	ARTHUR FRY



RICHARD M. SHERMAN & ROBERT B. SHERMAN

Can you imagine writing songs for a living with your brother or sister?
Richard and Robert Sherman came from a long line of songwriters: their father was the Tin Pan Alley songwriter Al Sherman, and their grandfather had been Samuel Sherman, Court Composer and Conductor for Emperor Franz-Josef of Austria-Hungary in the early 1900s. Over a fifty year span, they have become the songwriting team for many classic family movies and shows. During the 1960s, they were the primary song writers for the Disney Company, writing unforgettable songs for *Mary Poppins, The Jungle Book, The Aristocats, The Parent Trap, The Sword in the Stone, Bedknobs & Broomsticks,* and the theme song for the ride, "It's a Small World." They wrote the scores to such films as *Snoopy Come Home* and *Charlotte's Web*. In 1968, their song "Chitty Chitty Bang Bang" for the film version of Ian Fleming's story was nominated for an Academy Award. They have won 3 Grammy Awards, had 24 Gold and Platinum Albums and have earned a star on the Hollywood Walk of Fame.

The Sherman Brothers

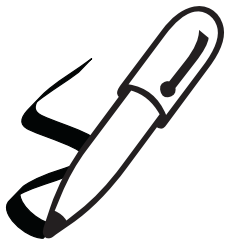
Brainstorm
WHAT'S SO A-MUSE-ING?

"SOMEONE TO STRIVE FOR
STAY ALIVE FOR
I HAVE YOU TWO"
- from *Chitty Chitty Bang Bang*

The dictionary defines a "muse" as "a source of inspiration" or "a guiding spirit." In Greek mythology, the muses were the nine daughters of Zeus who supervised all science and art. These days, we think of a "muse" as someone or something that inspires us to create, to keep going. For Caractacus Potts, his children, Jeremy and Jemima, are his muse. Who or what inspires you? What is your muse?

WHAT CAN MUSIC TELL US?

Chitty Chitty Bang Bang is an example of musical theatre. The essence of musical theatre is the merging of song and story, where songs help to move the story forward and let us know more about the characters. Use this chart to map out what we learn about the characters through their songs, and how the songs move the story forward:



CHARACTER(S)	SONG	INSIGHTS
1. POTTS, JEREMY, JEMIMA	"I HAVE YOU TWO"	
2. GRANDPA	"I HAVE THEM THREE"	
3. POTTS, TRULY	"TOOT SWEETS"	
4. BORIS, GORAN	"ACT ENGLISH"	
5. POTTS	"HUSHABYE MOUNTAIN"	
6. POTTS, ENSEMBLE	"ME OL' BAMBOO"	
7. GRANDPA, JEREMY, JEMIMA	"POSH"	
8. POTTS, TRULY, THE CHILDREN	"CHITTY CHITTY BANG BANG"	
9. TRULY, JEREMY, JEMIMA	"TRULY SCRUMPTIOUS"	
10. GRANDPA, INVENTORS	"THE ROSES OF SUCCESS"	
11. CHILDCATCHER	"CHILDCATCHER'S SONG"	
12. POTTS, ENSEMBLE	"TEAMWORK"	
13. BARON, BARONESS	"MY LITTLE CHOOCHIE FACE"	
14. BARON, BARONESS	"BOMBIE SAMBA"	

POETIC DEVICES

Songwriters often use poetic devices as tools to make their lyrics flow and make sense. First, write brief descriptions of these poetic tools, then circle examples of each in this song from *Chitty Chitty Bang Bang*.

Simile:

Metaphor:

Hyperbole:

Anaphora:

Onomatopoeia:

Assonance:

Perfect Rhyme:

Near Rhyme:

Internal rhyme:

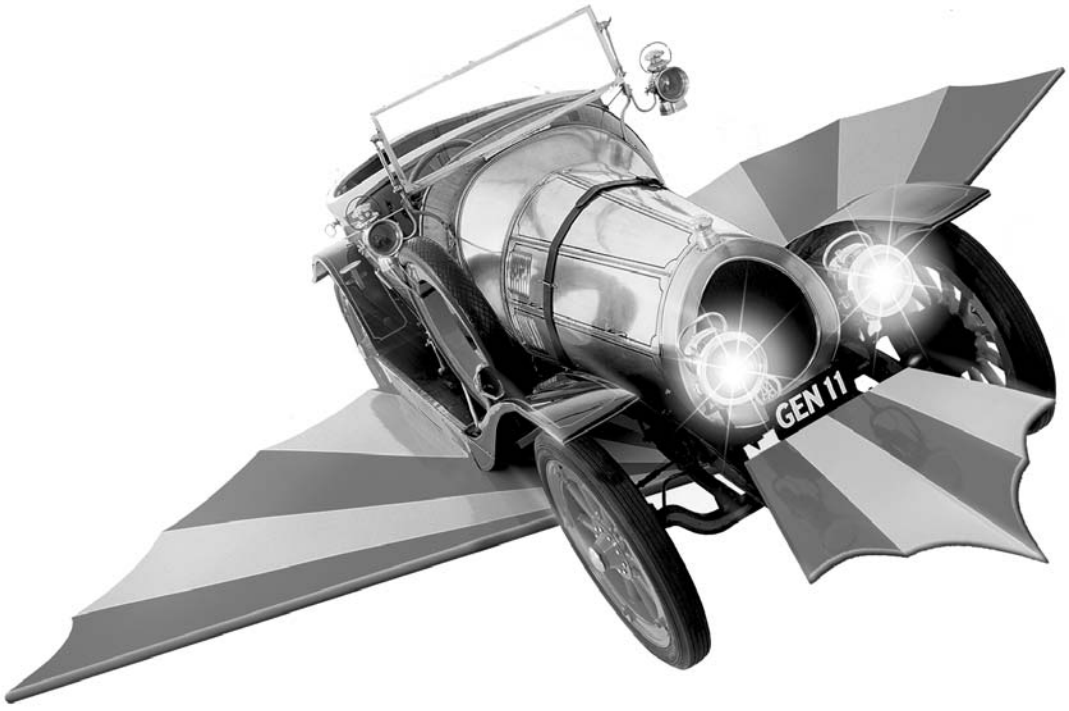
"Oh you pretty Chitty Bang Bang,
Chitty Chitty Bang Bang
We love you.
And, in
Chitty Chitty Bang Bang
Chitty Chitty Bang Bang
What we'll do.
Near, far, in our motor car
Oh what a happy time we'll spend.
Bang Bang Chitty Chitty Bang Bang
Our fine four fendered friend.
Bang Bang Chitty Chitty Bang Bang
Our fine four fendered friend.
Chitty Bang Bang
Chitty Chitty Bang Bang
Chitty Bang Bang
Chitty Chitty Bang Bang
Chitty Bang Bang
Chitty Chitty Bang Bang
Oh you pretty Chitty Bang Bang
Chitty Chitty Bang Bang
We love you.
And, in
Chitty Chitty Bang Bang
Chitty Chitty Bang Bang
What we'll do.
Near, far, in our motor car
Oh what a happy time we'll spend.
Bang Bang Chitty Chitty Bang Bang
Our fine four fendered friend.
Bang Bang Chitty Chitty Bang Bang
Our fine four fendered friend.
Your sleek as a thoroughbred.
Your seats are a feather bed.
You'll turn everybody's head today.
We'll glide on our motor trip
With pride in our ownership
The envy of all we survey.
Oh Chitty You Chitty
Pretty Chitty Bang Bang
Chitty Chitty Bang Bang
We love you.
And Chitty, in Chitty
Pretty Chitty Bang Bang
Chitty Chitty Bang Bang what we'll do.
Near Chitty, far Chitty, in our motor car
Oh what a happy time we'll spend.
Bang Bang Chitty Chitty Bang Bang
Our fine four fendered friend."

"THIS CAR'S UNBELIEVABLE
IT'S QUITE INCONCEIVABLE
THE MAGICAL WONDERS YOU'VE DONE
IT'S MORE THAN MIRACULOUS
SUPREMELY SPECTACULOUS"
- from *Chitty Chitty Bang Bang*

MATH & SCIENCE

"Men love to wonder, and that is the seed of science."

– Ralph Waldo Emerson



AH – BUT WILL IT FLY????
The Elements of Flight

Topic - How can I build a paper airplane that flies as well as the car in *Chitty Chitty Bang Bang*?

Time – several class sessions

Background - The four major forces that influence how airplanes fly are: LIFT, THRUST, WEIGHT and DRAG. (see image below) The forward and upward forces need to be stronger for the plane to move up and ahead, to fly.

In creating your own "flying machine" or a paper airplane, what elements will make up each of these forces? For example, WEIGHT would be determined by the paper used, its size, composition and/or decoration, THRUST will be determined by how hard you throw it. What elements will affect LIFT and DRAG?

Materials- Paper of various thicknesses or sizes, rulers, scissors etc.

Procedure - Many patterns are available for the design of paper airplanes and helicopters. These two websites have good printable designs in a variety of skill levels: www.bestpaperairplanes.com and www.paperairplanes.co.uk/planes.html .

Students will choose a design, build their first model, try it and then change the design to improve the flight. A competition element can be introduced to spice things up, but the competition should be in the most improved distance, or the improvement in straightness of flight, so that the emphasis is on making changes in one's own design.

Students will record the changes to the design that they make in order to improve the flight of their plane. Students should reference their changes back to the four forces that influence flight: LIFT, THRUST, WEIGHT and DRAG.

What Makes an Airplane Fly?

DRAG is a force which slows the forward movement of an airplane through the air.

LIFT is a partial vacuum created above the surface of an airplane's wing causing the wing to be "lifted" upward.

WEIGHT is caused by the force of gravity pulling down on the airplane.

T**HRUST** is a force created by a power source which gives an airplane forward motion.

HOW HIGH WILL IT FLY?

Right Triangle Trigonometry in Chitty Chitty Bang Bang

Objectives

- Construct a home-made angle-measuring instrument using given materials
- Construct and label a diagram based upon given information
- Appropriately utilize the sine, cosine, and tangent relationships in a right triangle in order to solve a problem
- Effectively use a calculator to provide decimal approximations of the sine, cosine, and tangent of a specific angle in degrees
- Effectively utilize a calculator to provide the angle measurement when given a specific ratio of the sides of a right triangle.

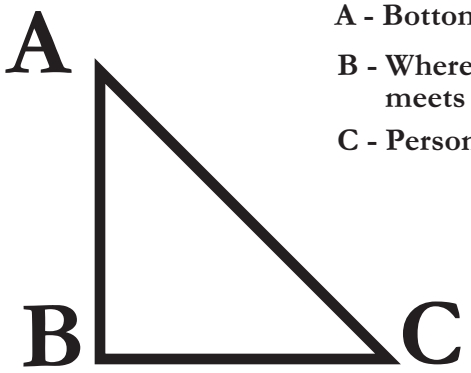
Materials

- Yard sticks
- Protractors
- String
- Small pebbles/rocks
- Markers
- Tape
- Chart Paper

Procedure

The teacher will bring the students to the window and pose the question "How high is the bottom of the window from the ground outside?" Typical student responses will be to measure it. So, then the teacher must ask the students to imagine the classroom high up in a skyscraper. "How could the height from the ground to the window be calculated without actually dropping a tape measure down?" Next the teacher will introduce the concept of sine, cosine, and tangent, as the ratios of the sides of the right triangle to a particular angle within the triangle.

The teacher will then draw a diagram of a right triangle on the board to represent the situation of the initial question. (Teacher can use more details on board)



A - Bottom of window

B - Where building meets the ground

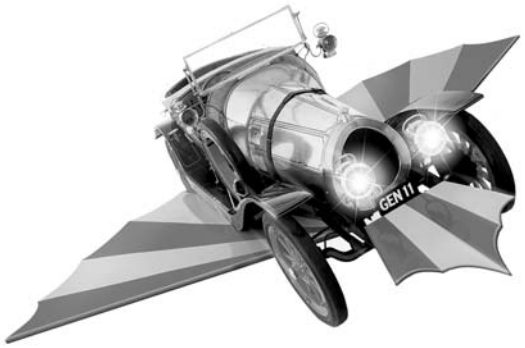
C - Person

The idea of angle of elevation will be introduced and indicated on the diagram from the person looking up at the window. The students will brainstorm to figure out what information they can measure in addition to the angle of elevation in order to find the height of the window. The teacher will then put the students into groups and give each group a yard stick, protractor, piece of string, and a pebble. Students will follow the teacher's model in order to construct a version of the clinometer (an angle-measuring instrument) from the protractor tape, string, and pebble. Use the string to tie a pebble at one end and then tie the other end to the middle of the protractor. Hold the protractor upside down so that the string with the weight pulls the string down. Hold the protractor to your eye to read the angle of elevation.

Students will proceed outside to use their newly made instrument along with a yard stick to determine how high the bottom of the window is from the ground. Students will arbitrarily measure out a distance from the building (BC in the diagram on page 36). Each group will use a different distance. Then a member of the group will measure the angle of elevation to the bottom of the window. These measurements will then be placed in the group's diagram and they will use trigonometry to determine the height of the window (AB in the diagram on page 36). Students will probably need the teacher to suggest that the measurement from the ground to the eyes of the student that measured the angle of elevation must be added to AB in order to receive an accurate answer.

In their respective groups students will use markers to write the diagram, measurements and calculations on chart paper. Each group will use tape to post their findings. Students will view the work of others and see how close their answers were to each other. Then the teacher will send a student outside with a marker. Holding a marked end of a long piece of string, a student inside the classroom will hold the marked end and drop the other end out the window. The student outside will then place a mark on the part of the string that hits the ground. The student in the window will then drop the other end and the student outside will return with the string. A class volunteer will then measure it using the yard stick and students will compare the actual height to the heights that were found using trigonometry. The teacher could discuss why there may be any discrepancies if necessary.

Now that students understand the benefit of using right triangle trigonometry, the teacher will introduce the idea of angle of depression and the students will complete the following classwork examples.



1. Chitty Chitty Bang Bang rises at an angle of 14° with the ground. Find to the nearest foot the distance Chitty has flown when it has covered a horizontal distance of 1500 feet.

2. Chitty Chitty Bang Bang takes off at an angle of 16° to the horizon. To the nearest foot, how high does Chitty rise after traveling a distance of 3800 feet?

3. Chitty Chitty Bang Bang takes off at an angle of 11° with the ground. Find to the nearest foot the distance Chitty has traveled when it has attained an altitude of 400 feet.

4. Chitty Chitty Bang Bang is flying over the London landmark Big Ben at an altitude of 3000 feet. The angle of depression to the top of Big Ben is 27°. Find to the nearest foot the distance between Chitty and the top of Big Ben.

5. Baron Bomburst is traveling through the waters of the English Channel in his yacht. From the top of a lighthouse 190 feet high, the angle of depression to Baron Bomburst out at sea measures 34°. Find to the nearest foot the distance from Baron Bomburst to the foot of the lighthouse.

6. A person 50 meters from the foot of the castle spots the kidnapped children in the top of the tower. The angle of elevation to the top of the tower is 48°. Find the height of the tower to the nearest meter.

7. On a trial flight, Chitty gets stuck in a tree. Someone on the ground 40 meters away from the base of the tree sees Chitty. The measure of the angle of elevation of the stuck Chitty is 42°. Find how high Chitty is off the ground.

8. Chitty is driving up a hill on a straight road that is 2500 meters long and makes an angle of 12° with the horizontal. Find to the nearest meter the height of the hill.

National Council of Teachers of Mathematics Standards (www.NCTM.org)
- Apply appropriate techniques, tools, and formulas to determine measurements
- Use visualization, spatial reasoning, and geometric modeling to solve problems

WHO SAID WHAT?

Throughout this guide there have been quotes of inventors and authors. Here is brief look at who some of these people are, with an additional quote to help inspire you.

Charles F. Kettering (1876 - 1958)

US electrical engineer & inventor; invented self-starting automobile ignition system

"Keep on going and the chances are you will stumble on something, perhaps when you are least expecting it. I have never heard of anyone stumbling on something sitting down."

Albert Einstein (1879 - 1955)

US (German-born) physicist; discovered special relativity 1905 & general relativity 1915-1916; explained photoelectric effect & Brownian motion; Nobel Prize in Physics 1921

"Imagination is more important than knowledge..."

Arthur C. Clarke (1917 -)

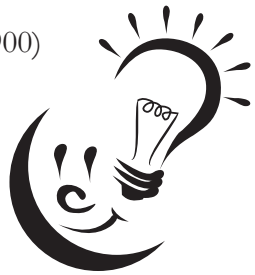
English astrophysicist & science fiction author in Sri Lanka; proposed geosynchronous satellite & communications satellite; wrote novels *2001: A Space Odyssey* 1968, *Rendezvous with Rama* 1973

"The only way to discover the limits of the possible is to go beyond them into the impossible."

Colonel Lyman Frank Baum (1856-1919)

US journalist and writer, whose best-known book is *The Wonderful Wizard of Oz* (1900)

"I have a feeling we're not in Kansas anymore."



Thomas A. Edison (1847 - 1931)

US inventor; invented phonograph 1876; invented electric light 1879

"Genius is one percent inspiration, ninety-nine percent perspiration."

Arthur O'Shaughnessy (1844-1881)

English author; earned his living in the Natural History Department of the British Museum, which he joined as a junior assistant in the Department of Printed Books in June 1861. He eventually became a valued expert on reptiles. O'Shaughnessy published four volumes of poetry, in 1870, 1872, 1874, and posthumously in 1881.

"For each age is a dream that is dying, Or one that is coming to birth."

Ralph Waldo Emerson (1803 - 1882)

US essayist & poet; wrote "The Conduct of Life" 1860, "Society and Solitude" 1870, "Letters and Social Aims" 1876

"All life is an experiment. The more experiments you make the better."

RESOURCES

TEXTS

Chitty Chitty Bang Bang by Ian Fleming (Aeonian Press, 1964)

Ian Fleming: The Man Behind James Bond by Andrew Lycett (Turner Publishing, 1995)

The Way Things Work by David Macaulay (Houghton Mifflin Company, 1988)

The Flash of Genius by Alfred B. Garrett (D. Van Nostrand Company, 1963)

Really Useful: The Origins of Everyday Things by Joel Levy (Firefly Books, 2002)

Inventors and Inventions of the Ancient World by Gordon C. Baldwin (Four Winds Press, 1973)

Inventions by Valerie Wyatt (Prentice Hall Books for Young Readers, 1987)

Discovery By Chance: Science and the Unexpected by Mary Batten (Funk & Wagnalls, 1968)

Inventorship: The Art of Innovation by Leonard M. Greene (John Wiley & Sons, Inc., 2001)

Weird & Wacky Inventions by Jim Murphy (Crown Publishers, 1978)

Inventing Modern America: From the Microwave to the Mouse by David E. Brown (MIT Press, 2002)

Wondrous Contrivances: Technology at the Threshold by Merritt Ierley (Clarkson Potter, 2002)

So You Want to Be An Inventor? By Judith St. George and David Small (Philomel Books, 2002)

What a Great Idea: Inventions that Changed the World by Stephen M. Tomecek (Scholastic, 2003)

Outward Dreams: Black Inventors and Their Inventions by Jim Haskins (Walker and Company, 1991)

Women Inventors by Linda Jacobs Altman (Facts On File, 1997)

Century Makers: One hundred clever things we take for granted which have changed our lives over the last one hundred years by David Hillman & David Gibbs (Welcome Rain, 1999)

VIDEO/DVD

Chitty Chitty Bang Bang (MGM/UA, 2002)

RECORDINGS

Chitty Chitty Bang Bang, Original Movie Soundtrack (Varese Records, 2004)

WEB SITES

Chitty Chitty Bang Bang web site:
http://www.chittythemusical.com/

The Invention Dimension: http://web.mit.edu/invent

National Inventors Hall of Fame: http://www.invent.org

Hold your own Invention Convention:
http://www.eduplace.com/science/invention/overview..html

ANSWERS

Pg. 10: Vulgaria

Pg. 20: We are in the dungeon

Pg. 21: 10, 7, 4, 3, 8, 5, 9, 1, 6, 2

ADDITIONAL LESSON PLAN CONTRIBUTIONS:

Laura Sullivan: Math Lesson Plan

Elizabeth Royston: Science Lesson Plan


GEN 11