

# HERSHEY'S



## Bean to Bar Cocoa Section

BlendMaster  
Hans Geyer



HERSHEY'S

HERSHEY'S

HERSHEY'S  
KISSES

Almond Joy

York

HERSHEY'S  
CACAO  
RESERVE

Reese's  
PEANUT BUTTER CUPS

SnackBalls  
Kit Kat

ICE BREAKERS  
Twizzlers

# Hans Geyer – Sr Manager Commodities

- 15 years M&M/Mars
  - Product commercialization / technology development engineering
  - Project engineering - Poland
  - Plant technical manager - Brazil
  - Nuts and Cocoa sourcing technical manager
  - Chocolate process development engineer
  - Wanderer – lived on 3 different continents – completed project on Global basis
- 18 years Hershey Company
  - Process improvement engineer
  - Chocolate technical manager
  - Cocoa, dairy, and sugar technical manager



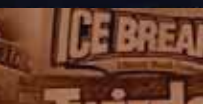
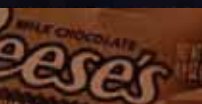
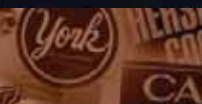
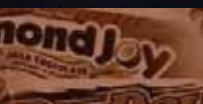
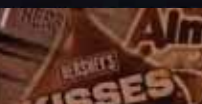
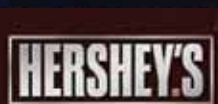


# CACAO MAJOR ORIGINS

15° North and South of the Equator

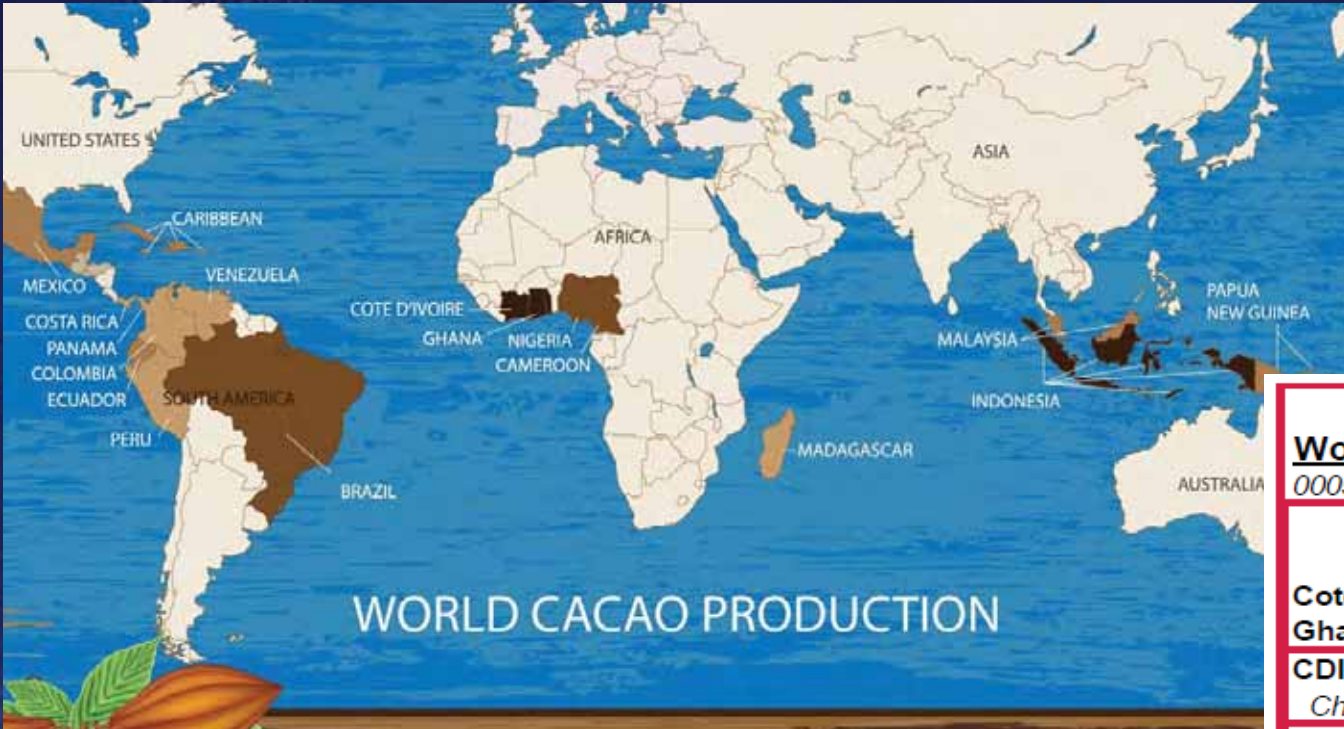


What are the top cocoa producing countries?



# CACAO MAJOR ORIGINS

15° North and South of the Equator

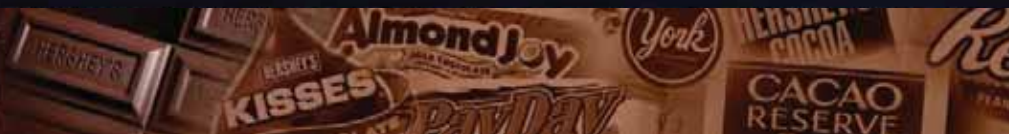


## World Cocoa Supply/Der

000s MT

	2020/21 ICCO
Cote d'Ivoire	2,248
Ghana	1,047
<b>CDI + Ghana</b>	<b>3,295</b>
<i>Change</i>	420
<b>Nigeria</b>	<b>270</b>
<b>Cameroon</b>	<b>290</b>
<b>Brazil</b>	<b>200</b>
<b>Ecuador</b>	<b>350</b>
<b>Indonesia</b>	<b>180</b>
<b>ROW</b>	<b>590</b>
<b>World Production (Gross)</b>	<b>5,175</b>
<b>World Production (Net)</b>	<b>5,123</b>
<b>World Grindings</b>	<b>4,911</b>
<i>Change</i>	4.3%
<b>S&amp;D Balance</b>	<b>212</b>

What percent of world cocoa does Hershey use?



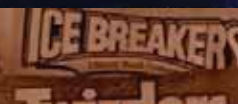
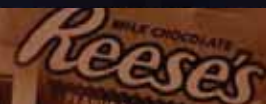
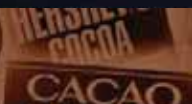
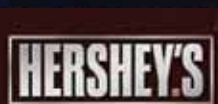


# FLOWER TO COCOA POD



- “Food of Gods”
- Flower to pods-180 days
- Up to 60 pods per harvest

*Question:* What role does Diptera Ceratopogonidae play in the production of cocoa?





# Historical Classification

Bonus - what classic bottle is based off the shape of cocoa pod?



Criollo



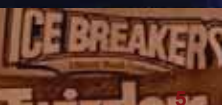
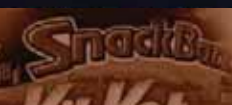
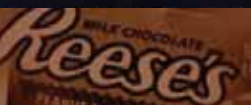
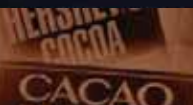
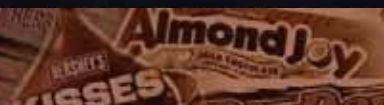
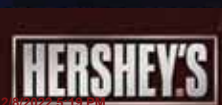
Forastero  
(Amelonado)



Trinitario



Nacional





# Historical Classification

Bonus - what classic bottle is based off the shape of cocoa pod



Criollo



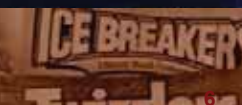
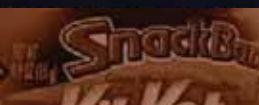
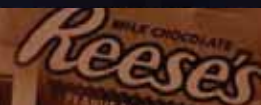
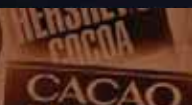
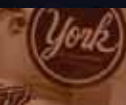
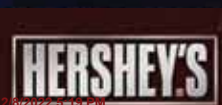
Forastero  
(Amelonado)



Trinitario



Nacional





## Bonus – What color are fresh cocoa beans inside?



HERSHEY'S

HERSHEY'S

HERSHEY'S  
KISSES

Almond Joy  
ALL OCCASIONS

York

HERSHEY'S  
COCOA  
CACAO  
RESERVE

HERSHEY'S  
REESSE'S  
PEANUT BUTTER CUPS

SnackBalls  
Kit Kat

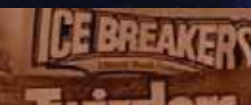
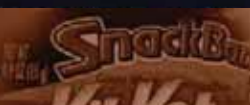
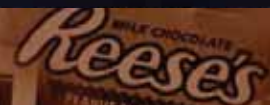
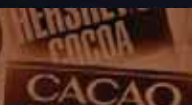
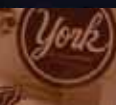
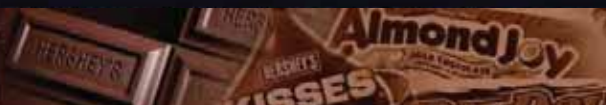
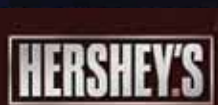
ICE BREAKERS  
Twizzlers



## Bonus – What color are fresh cocoa beans inside?

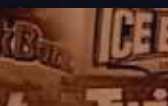
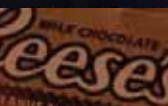
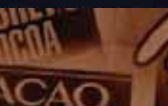
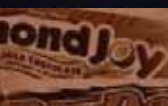
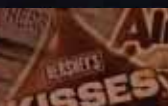
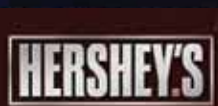


Purple





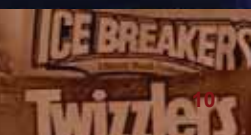
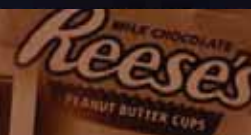
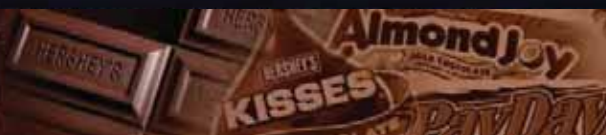
# Breaking of the Pods – Collection of the “Baba”





# Fermentation Why is it Important

- Break down of the pulp. Makes allows the bean to be dried and processed.
- Death of the bean allows of polyphenol oxidase to react, reduction in bitterness and astringency – Antioxidants.
- Development of aromatic, fruity and winey notes.
- Development of chocolate precursors from proteins.
- Development of Off Flavors – Hammy, Fishy, Ammonia, Earthy and Moldy.
- Increases fat in the bean, addition by subtraction





# Classic African Fermentation

Natural inoculation – air, hands of workers, banana leaves, insects, fermentation boxes.



1. Basic process is to heap into a pile
2. Cover with banana leaves
3. Turn the pile over after 3 days
4. Ferment another 2 days



Good Cocoa Flavor – Origins Ivory Coast, Ghana, Nigeria

HERSHEY'S

HERSHEY'S

HERSHEY'S  
KISSES

Almond Joy

your

HERSHEY'S  
CACAO  
RESERVE

HERSHEY'S  
REESE'S  
PEANUT BUTTER CUPS

HERSHEY'S  
SNACKS  
Kit Kat

HERSHEY'S  
ICE BREAKERS  
Twizzlers



# Box Fermentation at Larger Co-ops



1. Beans start in the top box
2. Each day or 2 they move down a box



Tend to over ferment – more sour – Origins Brazil, Papua New Guinea, DR, Mexico



## Other types of fermentation

Ferment in Bags



Wet cocoa is stored in bags for 1-2 days

Small Fermentation



Fermented in wood vat or box

No fermentation



Pulp is washed of the beans and then they are dried "Lavado".

Variable Flavor – more astringent, bitter, and fruity  
Origins Indonesia, Ecuador, Peru, Mexico other smaller origins





# Evaluating Fermentation – 4 classes



HERSHEY'S

HERSHEY'S

Almond Joy  
KISSES  
PEANUT BUTTER CUPS

York

HERSHEY'S  
CACAO  
RESERVE

Reese's  
PEANUT BUTTER CUPS

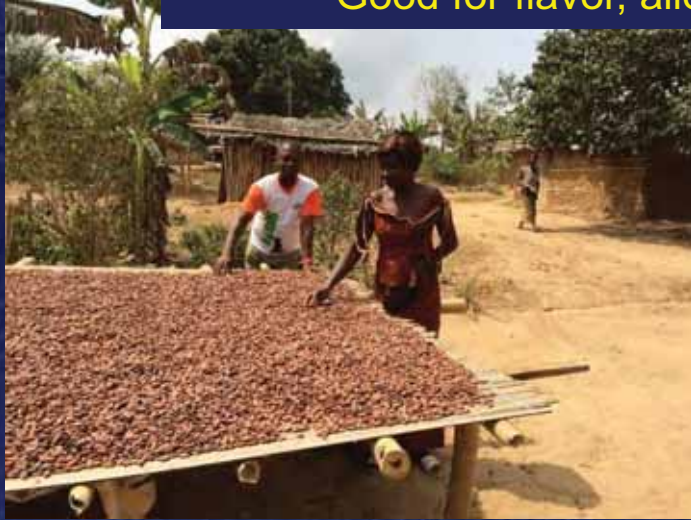
SnackBalls  
Kit Kat

ICE BREAKERS  
Twizzlers

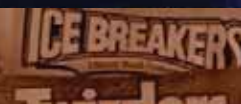
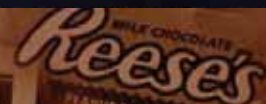
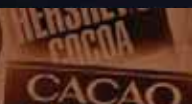
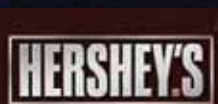


# SUN DRYING

Widely used, most bulk beans, low assets, dependent on the sun  
Good for flavor, allows some organic acids to volatilize



Improper drying can lead to moldy beans and off notes



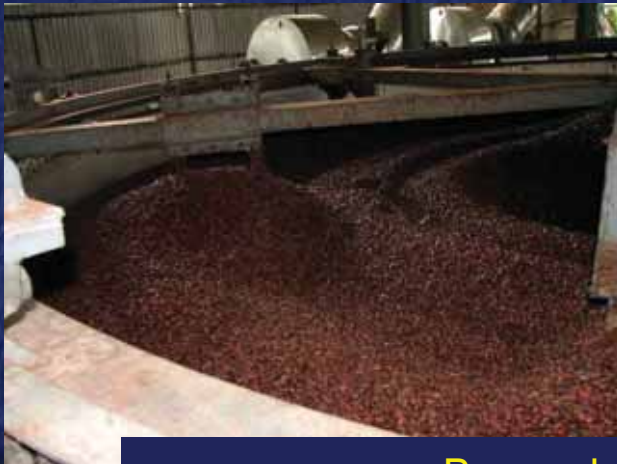


# Artificial Drying

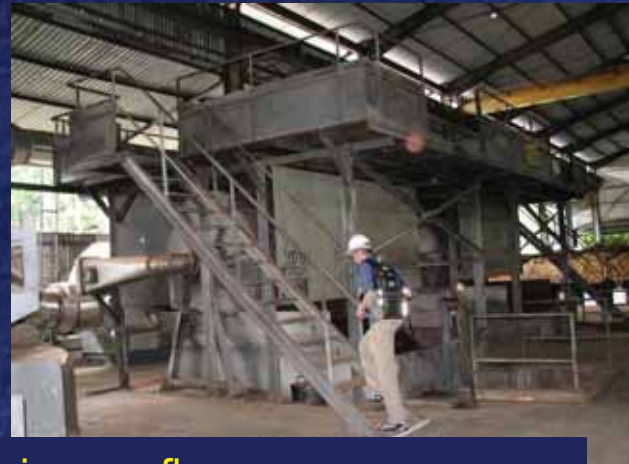
Important in "rainy" harvest areas



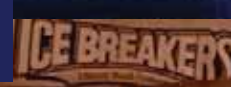
Perforated Floor



Drum Dryer



Beans dry rapidly – locks in sour flavor  
Origins – Brazil, Cameroon, PNG, Mexico, DR





# Defects Develop from Improper Drying "Smoky Flavors"



Fumes from the fuel source are absorbed by the beans  
Smoky and Burnt Rubber – "Ghirardelli Flavor"

HERSHEY'S

KISSES

CACAO RESERVE

PEANUT BUTTER CUPS

KitKat

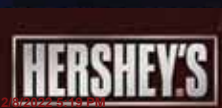
Twizzlers

ICE BREAKERS



# STEM Careers Are in Food Industry?

- Plant Science
- Food Science
- Sensory Science
- Microbiology
- Data Science – crop modeling
- Risk management
- Analytical Science
- Engineering





# Purdue Engineers at Hershey

- Agricultural Engineer – Commodity Manager – (me)
- Agricultural Engineer – HR – Data Analytics
- Chemical Engineer – VP Chief Procurement Officer
- Chemical Engineer –VP Media
- Mechanical Engineer – Senior VP – Chief Growth Officer

Technical Degrees Open Doors

