

# Designing Computer Games to Teach Children About Food Safety



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The Partnership for Food Safety Education

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## Special Thanks to The Partnership for Food Safety Education

This material is based upon work supported by the Cooperative State Research, Education and Extension Service, under special project number 00-51110-9746.



# Objectives

- To determine features of educational computer games that appeal to children
- To design games, incorporating those features, to introduce children in grades K-3 to foodborne illness and safe food handling principles
- To evaluate the games in elementary schools in a three state area



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# Methods - Design

- Focus Groups With Children
  - 100 children
  - Grades K-3
  - Diversity of ethnic backgrounds
  - Diversity of academic achievement levels

- Analysis of game features
- Usability testing – 2 occasions

All methods used in this study received IRB approval from the three institutions.



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# Methods-Design

- Focus Groups With Teachers
  - 15 teachers
  - K-3<sup>rd</sup> grade
- Analyzing game designs
- Evaluating age-appropriateness for K-3
- Determining compliance with state curriculum standards



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# Focus Group Results - Design

- **Students' "favorite" features**
  - Let you "pick things"
  - Let you choose who you want to be
  - Let you shoot
  - Let you print things
  - Do silly things
  - Have music and noises
  - Make silly noises when you do something wrong



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# Focus Group Results - Design

- Teachers' "favorite" features
  - Comply with curriculum standards
  - Will work on PC and Mac
  - Can be loaded onto central server to allow many kids to play simultaneously
  - Can control sound
  - Want resources that can be used with a variety of academic levels including gifted students



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# Methods - Development

- **Games**

- 6 games with music, voice-over and sounds
- 3 difficulty levels (easy, medium, hard)
- 1 & 2 player formats

- **Resources**

- BACtionary
- BAC facts
- BAClopedia (Kids' version and Teachers' version)



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# Features of the Game CD-ROM Based on Student and Teacher Input



# Methods - Experimental Design

## Control vs. Experimental Design

- **Control Groups K-3**
  - *Smart Kids Fight BAC!*<sup>®</sup> animated video
  - *Smart Kids Fight BAC!*<sup>®</sup> activity books
- **Experimental Groups K-3 (CD-ROM Groups)**
  - *Smart Kids Fight BAC!*<sup>®</sup> animated video
  - *Smart Kids Fight BAC!*<sup>®</sup> activity books
  - *Smart Kids Fight BAC!*<sup>®</sup> food safety computer games



# Methods – Evaluation Design

- Knowledge pre-test (Day 1)
- Knowledge post-test (Day 14)
- Knowledge post-post test (8 weeks from Day 14)



# Methods – Implementation

- Day 1
  - Completed the knowledge pre-test
  - Viewed the animated video
- By day 14
  - Engaged in activities from the activity booklets
  - Completed curriculum (including game play by the experimental group)
  - Completed the knowledge post-test
- 8 weeks later
  - Completed knowledge post-post-test





# Results

- The control group (n=614) scored significantly higher than the CD-ROM group (n=620) on the pre-test ( $p < 0.05$ ).
- There was no significant difference between the control group and the CD-ROM group on the post-test ( $p > 0.05$ ).
- By the end of the 8-week period, the CD-ROM group had a significantly greater increase in food safety knowledge over the course of the study than did the control group ( $p < 0.05$ ).



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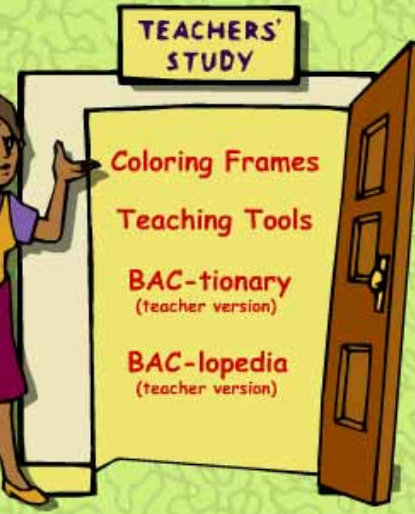
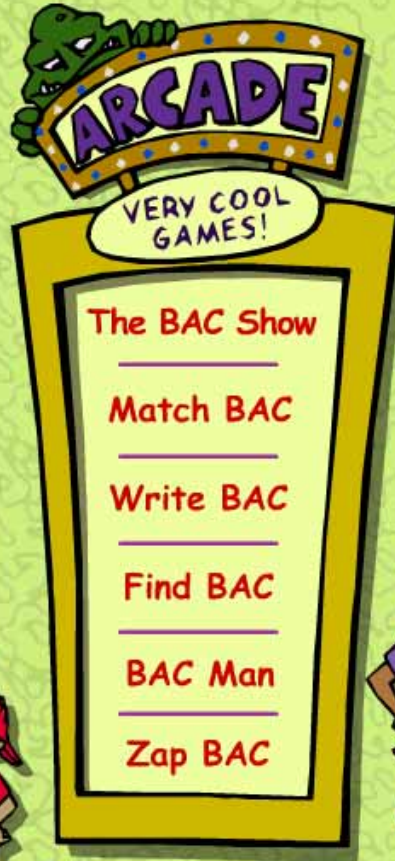
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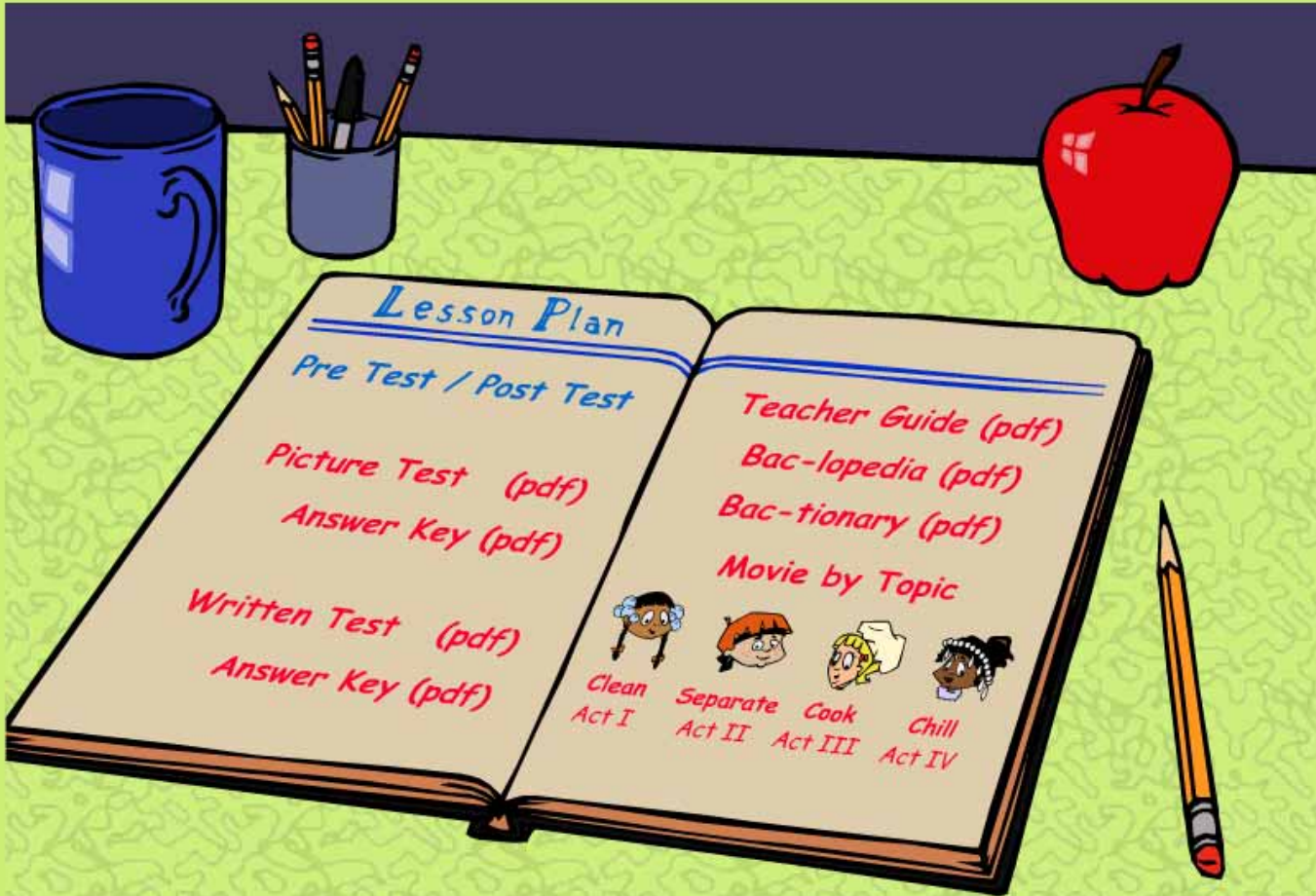
# Implications

- Presenting food safety information using computer game technology may stimulate children's interest in and ability to learn safe food handling principles.





QUIT



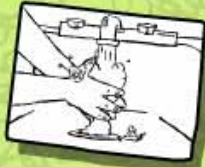
Main Menu

Sound Off



# COLORING FRAMES

Choose a Picture  
to Color



Main Menu



How to Play

Close 

**BAC Show**

WELCOME TO THE  
**BAC SHOW**

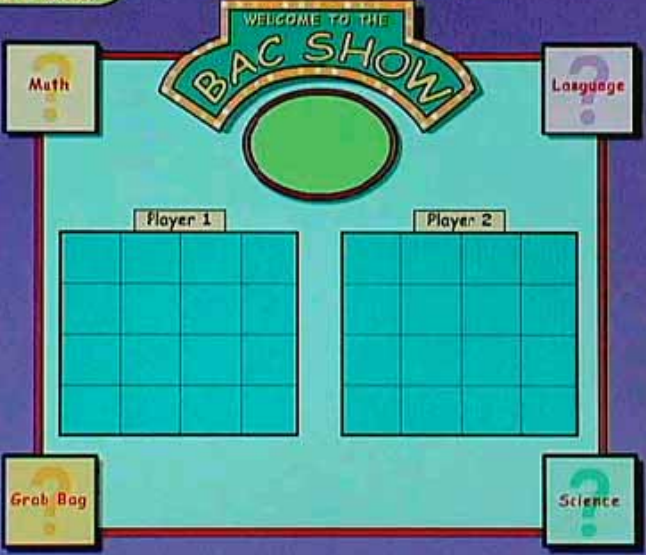
Math Language  
Grab Bag Science

Player 1 Player 2

Score	
Player 1	Player 2
0	0

Timer  
:00

BAC Hints  
Main Menu

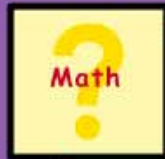


Skip



Players 1 2  
Help  
Easy   
Medium   
Hard   
End Game

## BAC Show



Score	
Player 1	Player 2
0	0

Timer  
**:54**

BAC Hints

Main Menu

### Quiz Time

Question about Science

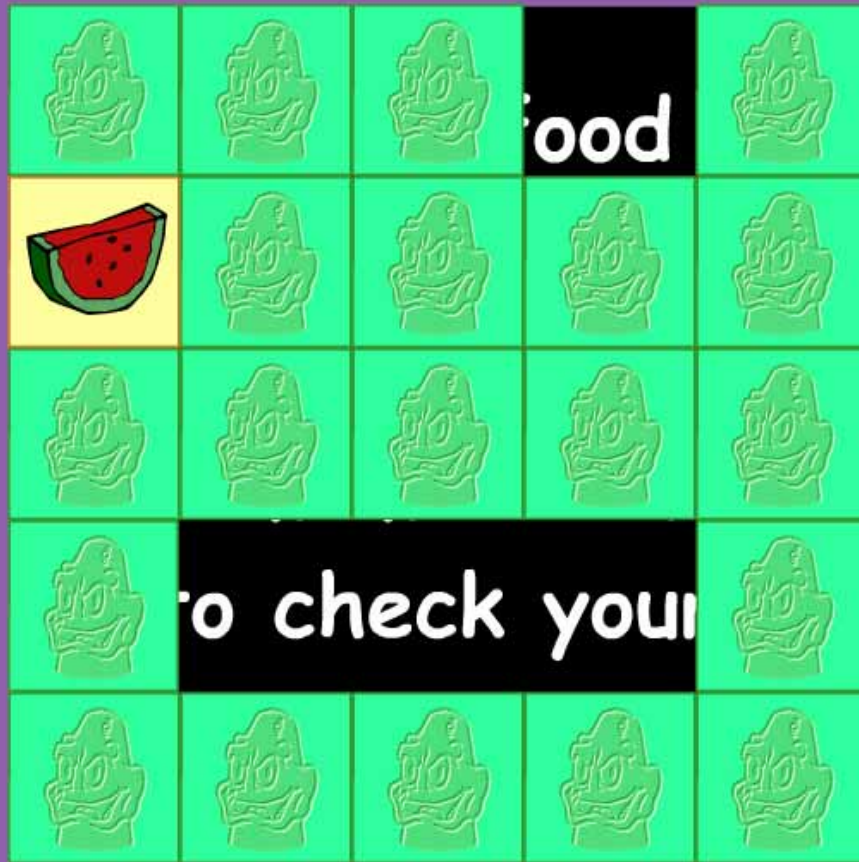
When cooking foods like meats, poultry, and eggs, a temperature of 80° F will kill harmful bacteria.

Pick One Answer:

- a) True
- b) False

Players **1** | **2**  
Help  
Easy   
Medium   
Hard   
End Game

## Match BAC



Score  
2

Main Menu

## Find Bac

Help

Easy

Medium

Hard

Show Me

You Have Found

0 of 15

Mistakes in  
this picture



Main Menu

Players 1 2

Help

Easy

Medium

Hard

End Game

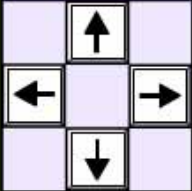
Select a Character



Score

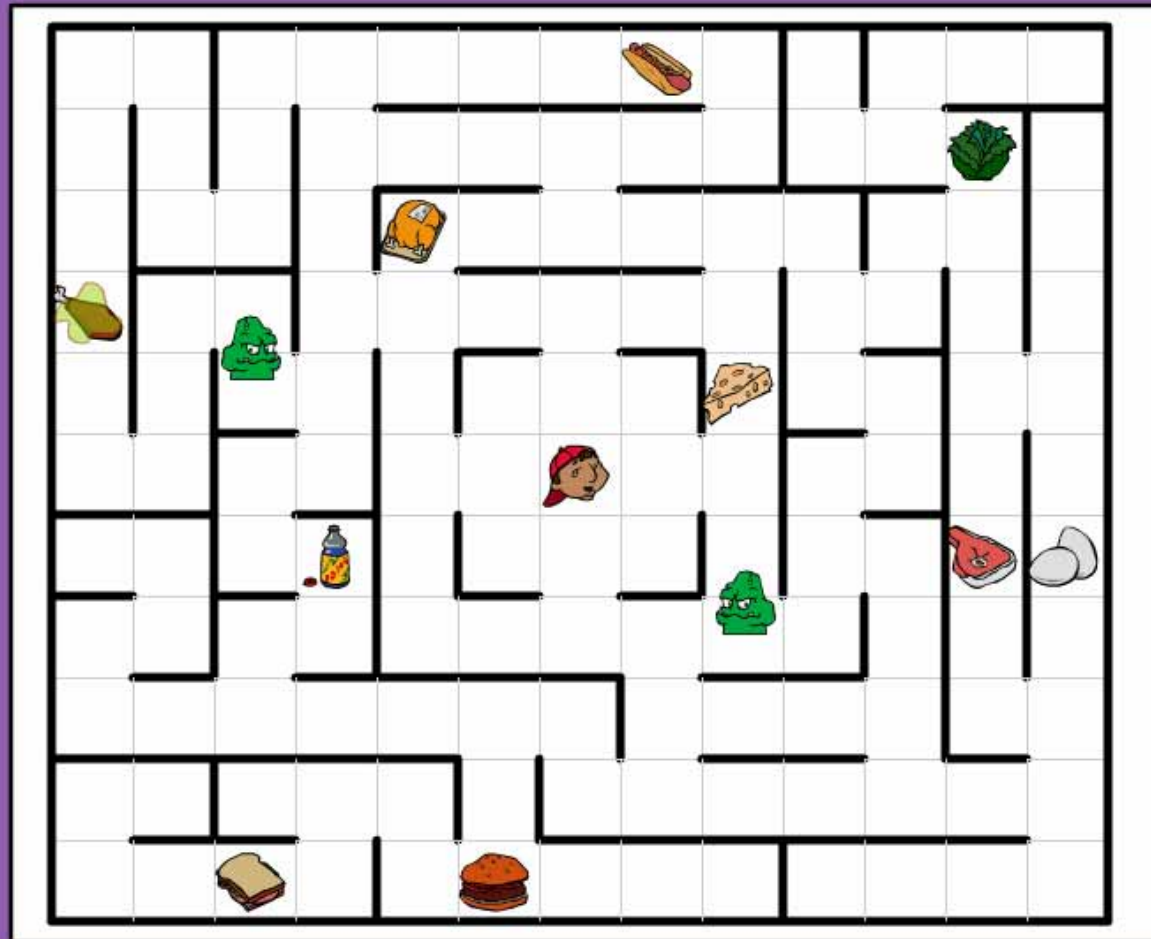
0

Use Arrow Keys to move



Main Menu

# BAC Man



Players **1** **2**

Help

Easy

Medium

Hard

End Game

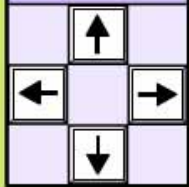
Select a Character



Score

3

Use Arrow Keys to move



Main Menu

# BAC Man





# Zap BAC

Players **1** **2**

Help

Easy

Medium

Hard

Choose Your Zapper

Flame



Thrower



Zapper

Bubble



Blaster

Chill



Ray

End Game

Score

3

Timer

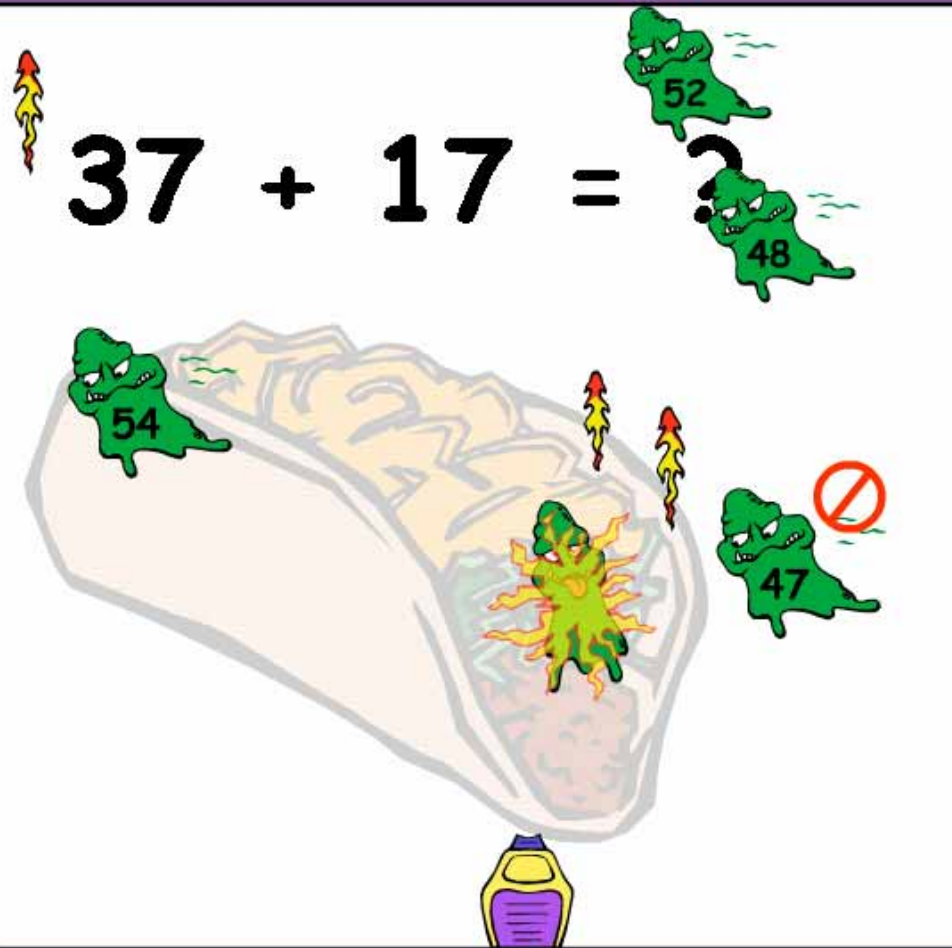
:26

Use Arrow keys to move



Use Space Bar to fire

Main Menu



Help

Easy

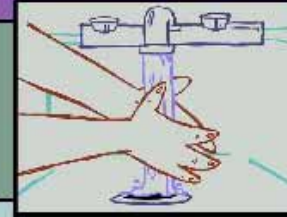
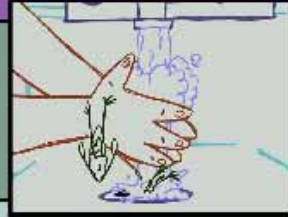
Medium

Hard

Pick a Topic

**End Story**

## Write BAC



◀ More

Picture Library

Show Story

Print Story



BAC-tionary

BAC-lopedia

BAC Facts

Storyboard

Forward ▶

1

2

3

4

5



Text for slide #3

BAC hoped they would forget to wash their hands.



Main Menu

Help  
 Easy   
 Medium   
 Hard   
 Pick a Topic  
 End Story

Write BAC



◀ More

Show Story

Print Story

BAC-tionary

BAC-lopedia

BAC Facts



My Story Close ✕

Story Title:

Your Name:







Show Story

Print Story



Forward ▶

1



5



Text for slide #3

BAC hoped they would forget to wash their hands.

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Main Menu

Help  
Easy   
Medium   
Hard   
Pick  
a Topic  
End Story

Show Story

Print Story

BAC-tionary

BAC-lopedia

BAC Facts

Main Menu

## Write BAC

◀ Back Forward ▶

Close ✕



On the way home from school the girls petted Rover.



Help

Write BAC

Easy

## BACtionary

Select a Letter: **A B C D E F G H I J K L M N O P Q R S T U V W X Y Z**

**Death Phase:** when more bacterial cells are dying than are multiplying or being made; the number of bacterial cells is getting smaller

**Degree:** a unit of measure for temperature

**Destroy:** to kill or do away with

**Diarrhea:** having to poop a lot and often; usually runny poop

**DNA:** a chemical that is in all living things and contains the plans for what the living thing will be like

Close

Main Menu

# Kids BAC-lopedia

Top

Close

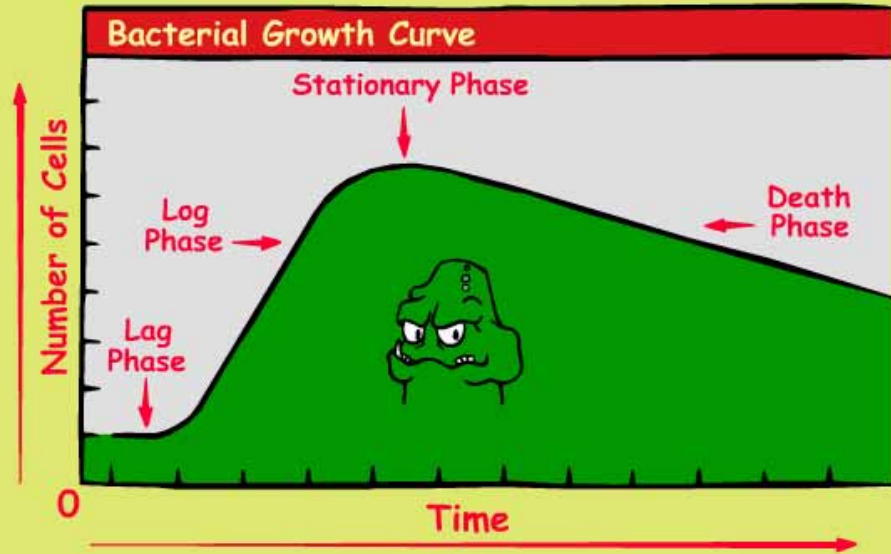
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Bacte

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not



Close



Go ahead...  
try to beat me...  
if you dare!



the end



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