

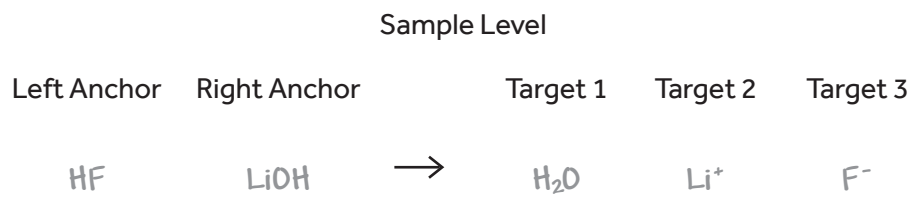
Acids & Bases Quest

Now that you have completed the Acids & Bases Challenges, you are ready to conduct this Acids & Bases Quest.

MISSION 1. GATHER YOUR INTEL

Use your Collisions gameplay experience to gather the following intel:

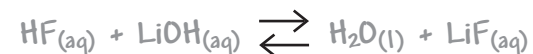
1. Label the molecule you used on the 'Left Anchor.'
2. Label the molecule you used on the 'Right Anchor.'
3. Label each target.



MISSION 2. EXPOSE THE DETAILS

Use your expertise to expose the following information.

Balanced Chemical
Reaction



Reaction Analysis

What is the acid?	HF	Is this a neutralization reaction?	yes
What is the base?	LiOH	If yes, what salt is formed?	LiF

Acid Analysis

Base Analysis

Acid name	hydrofluoric acid	Base name	lithium hydroxide
Strong or weak acid	Weak	Conjugate acid	H ₂ O
Conjugate base	F ⁻	Color after red litmus paper test	Blue
Color after red litmus paper test	Red	Color after blue litmus paper test	Blue
Color after blue litmus paper test	Red		

K_a, pK_a, and pH

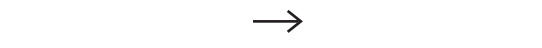
K _a	6.8 × 10 ⁻⁴	pH of acid at 0.1M	2	pH of base at 0.1M	13
pK _a	3.17	pOH of acid at 0.1M	12	pOH of base at 0.1M	1

Acids & Bases - Challenge Level 1

MISSION 1. GATHER YOUR INTEL

Left Anchor

Target 1



MISSION 2. EXPOSE THE DETAILS

Balanced Chemical Reaction	→
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Reaction Analysis			
What is the acid?		Is this a neutralization reaction?	
What is the base?		If yes, what salt is formed?	

Acid Analysis		Base Analysis	
Acid name		Base name	
Strong or weak acid		Conjugate acid	
Conjugate base		Color after red litmus paper test	
Color after red litmus paper test		Color after blue litmus paper test	
Color after blue litmus paper test			

K _a , pK _a , and pH					
K _a		pH of acid at 0.1M		pH of base at 0.1M	
pK _a		pOH of acid at 0.1M		pOH of base at 0.1M	

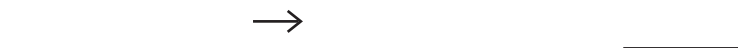
Acids & Bases - Challenge Level 2

MISSION 1. GATHER YOUR INTEL

Right Anchor

Target 1

Target 2



MISSION 2. EXPOSE THE DETAILS

Balanced Chemical
Reaction



Reaction Analysis

What is the acid?		Is this a neutralization reaction?	
What is the base?		If yes, what salt is formed?	

Acid Analysis

Base Analysis

Acid name		Base name	
Strong or weak acid		Conjugate acid	
Conjugate base		Color after red litmus paper test	
Color after red litmus paper test		Color after blue litmus paper test	
Color after blue litmus paper test			

K_a , pK_a , and pH

K_a		pH of acid at 0.1M		pH of base at 0.1M	
pK_a		pOH of acid at 0.1M		pOH of base at 0.1M	

Acids & Bases - Challenge Level 3

MISSION 1. GATHER YOUR INTEL

Left Anchor Right Anchor Target 1 Target 2 Target 3

_____ _____ → _____ _____ _____

MISSION 2. EXPOSE THE DETAILS

Balanced Chemical Reaction →

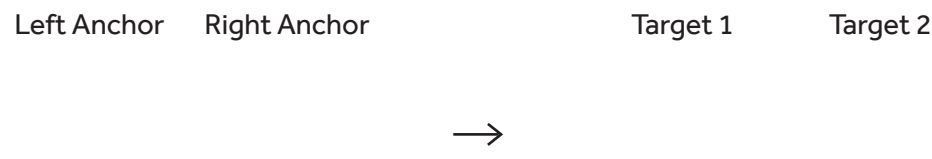
Reaction Analysis			
What is the acid?		Is this a neutralization reaction?	
What is the base?		If yes, what salt is formed?	

Acid Analysis		Base Analysis	
Acid name		Base name	
Strong or weak acid		Conjugate acid	
Conjugate base		Color after red litmus paper test	
Color after red litmus paper test		Color after blue litmus paper test	
Color after blue litmus paper test			

K _a , pK _a , and pH					
K _a		pH of acid at 0.1M		pH of base at 0.1M	
pK _a		pOH of acid at 0.1M		pOH of base at 0.1M	

Acids & Bases - Challenge Level 4

MISSION 1. GATHER YOUR INTEL



MISSION 2. EXPOSE THE DETAILS



Reaction Analysis

What is the acid?		Is this a neutralization reaction?	
What is the base?		If yes, what salt is formed?	

Acid Analysis

Base Analysis

Acid name	Base name
Strong or weak acid	Conjugate acid
Conjugate base	Color after red litmus paper test
Color after red litmus paper test	Color after blue litmus paper test
Color after blue litmus paper test	

K_a, pK_a, and pH

K _a		pH of acid at 0.1M		pH of base at 0.1M	
pK _a		pOH of acid at 0.1M		pOH of base at 0.1M	

Acids & Bases - Challenge Level 5

MISSION 1. GATHER YOUR INTEL

Left Anchor Right Anchor Target 1 Target 2 Target 3
 _____ _____ → _____ _____ _____

MISSION 2. EXPOSE THE DETAILS

Balanced Chemical Reaction	→
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Reaction Analysis

What is the acid?		Is this a neutralization reaction?	
What is the base?		If yes, what salt is formed?	

Acid Analysis

Base Analysis

Acid name		Base name	
Strong or weak acid		Conjugate acid	
Conjugate base		Color after red litmus paper test	
Color after red litmus paper test		Color after blue litmus paper test	
Color after blue litmus paper test			

K_a, pK_a, and pH

K _a		pH of acid at 0.1M		pH of base at 0.1M	
pK _a		pOH of acid at 0.1M		pOH of base at 0.1M	

Acids & Bases - Challenge Level 6

MISSION 1. GATHER YOUR INTEL

Use the information from the 2nd segment of Challenge 6.



MISSION 2. EXPOSE THE DETAILS

Balanced Chemical Reaction	→
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Reaction Analysis			
What is the acid?		Is this a neutralization reaction?	
What is the base?		If yes, what salt is formed?	

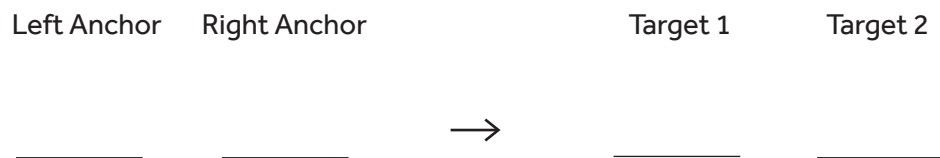
Acid Analysis		Base Analysis	
Acid name		Base name	
Strong or weak acid		Conjugate acid	
Conjugate base		Color after red litmus paper test	
Color after red litmus paper test		Color after blue litmus paper test	
Color after blue litmus paper test			

K _a , pK _a , and pH			
K _a		pH of acid at 0.1M	
pK _a		pOH of acid at 0.1M	pOH of base at 0.1M

Acids & Bases - Challenge Level 7

MISSION 1. GATHER YOUR INTEL

Use the information from the 2nd segment of Challenge 7.



MISSION 2. EXPOSE THE DETAILS



Reaction Analysis			
What is the acid?		Is this a neutralization reaction?	
What is the base?		If yes, what salt is formed?	

Acid Analysis		Base Analysis	
Acid name		Base name	
Strong or weak acid		Conjugate acid	
Conjugate base		Color after red litmus paper test	
Color after red litmus paper test		Color after blue litmus paper test	
Color after blue litmus paper test			

K _a , pK _a , and pH					
K _a		pH of acid at 0.1M		pH of base at 0.1M	
pK _a		pOH of acid at 0.1M		pOH of base at 0.1M	

Acids & Bases - Challenge Level 8

MISSION 1. GATHER YOUR INTEL

Use the information from the 1st and 2nd segments of Challenge 8.



MISSION 2. EXPOSE THE DETAILS

Balanced Chemical Reaction	→
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Reaction Analysis			
What is the acid?		Is this a neutralization reaction?	
What is the base?		If yes, what salt is formed?	

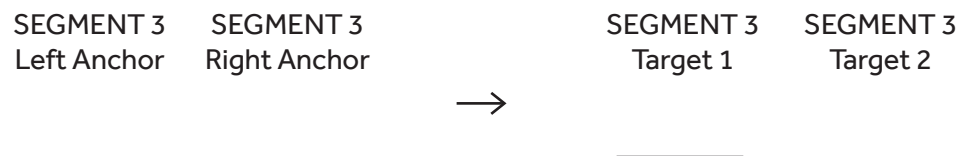
Acid Analysis		Base Analysis	
Acid name		Base name	
Strong or weak acid		Conjugate acid	
Conjugate base		Color after red litmus paper test	
Color after red litmus paper test		Color after blue litmus paper test	
Color after blue litmus paper test			

K _a , pK _a , and pH					
K _a		pH of acid at 0.1M		pH of base at 0.1M	
pK _a		pOH of acid at 0.1M		pOH of base at 0.1M	

Acids & Bases - Challenge Level 9

MISSION 1. GATHER YOUR INTEL

Use the information from the 3rd segment of Challenge 9.



MISSION 2. EXPOSE THE DETAILS



Reaction Analysis			
What is the acid?		Is this a neutralization reaction?	
What is the base?		If yes, what salt is formed?	

Acid Analysis		Base Analysis	
Acid name		Base name	
Strong or weak acid		Conjugate acid	
Conjugate base		Color after red litmus paper test	
Color after red litmus paper test		Color after blue litmus paper test	
Color after blue litmus paper test			

K _a , pK _a , and pH				
K _a		pH of acid at 0.1M		pH of base at 0.1M
pK _a		pOH of acid at 0.1M		pOH of base at 0.1M

Acids & Bases - Challenge Level 10

MISSION 1. GATHER YOUR INTEL

Use the information from the 3rd segment of Challenge 10.



MISSION 2. EXPOSE THE DETAILS

Balanced Chemical Reaction	\rightarrow
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Reaction Analysis			
What is the acid?		Is this a neutralization reaction?	
What is the base?		If yes, what salt is formed?	

Acid Analysis		Base Analysis	
Acid name		Base name	
Strong or weak acid		Conjugate acid	
Conjugate base		Color after red litmus paper test	
Color after red litmus paper test		Color after blue litmus paper test	
Color after blue litmus paper test			

K _a , pK _a , and pH					
K _a		pH of acid at 0.1M		pH of base at 0.1M	
pK _a		pOH of acid at 0.1M		pOH of base at 0.1M	

Acids & Bases and Covalent Bonding - Connected Level 1

MISSION 1. GATHER YOUR INTEL

Left Anchor Right Anchor Target 1 Target 2 Target 3

_____ _____ → _____ _____ _____

MISSION 2. EXPOSE THE DETAILS

Balanced Chemical Reaction	→
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Reaction Analysis			
What is the acid?		Is this a neutralization reaction?	
What is the base?		If yes, what salt is formed?	

Acid Analysis		Base Analysis	
Acid name		Base name	
Strong or weak acid		Conjugate acid	
Conjugate base		Color after red litmus paper test	
Color after red litmus paper test		Color after blue litmus paper test	
Color after blue litmus paper test			

K _a , pK _a , and pH					
K _a		pH of acid at 0.1M		pH of base at 0.1M	
pK _a		pOH of acid at 0.1M		pOH of base at 0.1M	

Acids & Bases and Covalent Bonding - Connected Level 2

MISSION 1. GATHER YOUR INTEL

Use the information from the 2nd segment.

Left Anchor Right Anchor → Target 1 Target 2
_____ _____ _____ _____

MISSION 2. EXPOSE THE DETAILS

Balanced Chemical Reaction →

Reaction Analysis			
What is the acid?		Is this a neutralization reaction?	
What is the base?		If yes, what salt is formed?	

Acid Analysis		Base Analysis	
Acid name		Base name	
Strong or weak acid		Conjugate acid	
Conjugate base		Color after red litmus paper test	
Color after red litmus paper test		Color after blue litmus paper test	
Color after blue litmus paper test			

K _a , pK _a , and pH				
K _a		pH of acid at 0.1M		pH of base at 0.1M
pK _a		pOH of acid at 0.1M		pOH of base at 0.1M

Acids & Bases and Covalent Bonding - Connected Level 3

MISSION 1. GATHER YOUR INTEL

Use the information from the 2nd segment.

Left Anchor	Right Anchor		Target 1	Target 2	Target 3
_____	_____	→	_____	_____	_____

MISSION 2. EXPOSE THE DETAILS

Balanced Chemical Reaction	→
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Reaction Analysis			
What is the acid?		Is this a neutralization reaction?	
What is the base?		If yes, what salt is formed?	

Acid Analysis		Base Analysis	
Acid name		Base name	
Strong or weak acid		Conjugate acid	
Conjugate base		Color after red litmus paper test	
Color after red litmus paper test		Color after blue litmus paper test	
Color after blue litmus paper test			

K _a , pK _a , and pH					
K _a		pH of acid at 0.1M		pH of base at 0.1M	
pK _a		pOH of acid at 0.1M		pOH of base at 0.1M	