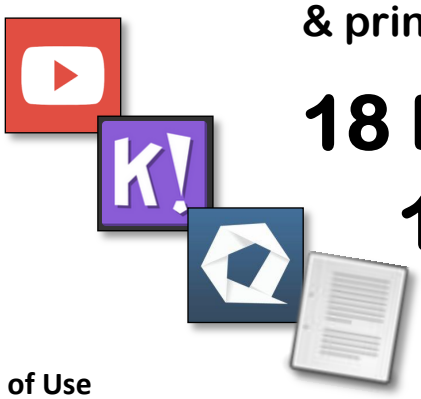
Crash Course Kids, Grade 5 Science

Engineering Design

YouTube, Kahoot! and Quizizz Links & printable worksheets



18 Episodes
199 Questions

Crash Course Kids

#1 - What's an Engineer?

Video Duration: 4:30 **11 Questions**

Join Sabrina in this episode of Crash Course Kids where she talks about what engineers do and why they do it!

Click the icon to play:

YouTube **Kahoot!** **Quizizz**

Crash Course Kids

#2 - The Engineering Process

Video Duration: 5:17 **14 Questions**

Sabrina talks to us about the Engineering Process and why we should do things in order, as well as many of the questions we should ask along the way.

Click the icon to play:

YouTube **Kahoot!** **Quizizz**

Crash Course Kids

#3 - Defining a Problem

Video Duration: 3:40 **10 Questions**

Sabrina talks about how we can all be better Engineers by understanding what problems we want or need to solve.

Click the icon to play:

YouTube **Kahoot!** **Quizizz**

Crash Course Kids

#4 - Defining Success

Video Duration: 3:59 **11 Questions**

Sabrina chats about how Engineers look at results to help them know when they've achieved success.

Click the icon to play:

YouTube **Kahoot!** **Quizizz**

Crash Course Kids

#5 - Got Some Solutions?

Video Duration: 4:01 **10 Questions**

So, there might not be just one solution to a problem. So, how do you come up with multiple solutions? In this episode, Engineer Sabrina shows us how to do that.

Click the icon to play:

YouTube **Kahoot!** **Quizizz**

Crash Course Kids

#6 - Let's Fly!

Video Duration: 5:30 **12 Questions**

Sabrina shows us how to select the best solution to a problem by going back to our original problem at the gorge.

Click the icon to play:

YouTube **Kahoot!** **Quizizz**

Crash Course Kids

#7 - A Case of "What-Ifs"

Video Duration: 3:55 **12 Questions**

Variables are a condition or value that can change. Sometimes we control a variable, sometimes we don't.

Click the icon to play:

YouTube Kahoot! Quizizz

Crash Course Kids

#8 - Engineering Games

Video Duration: 3:18 **11 Questions**

In this episode, Sabrina plays a game with Catbot to show us how a game can teach us about engineering.

Click the icon to play:

YouTube Kahoot! Quizizz

Crash Course Kids

#9 - Bowled Over - Isolating Variables

Video Duration: 4:38 **13 Questions**

Sabrina shows us how to isolate variables at the bowling alley. The trick is to isolate one variable at a time to get reliable results every time.

Click the icon to play:

YouTube Kahoot! Quizizz

Crash Course Kids

#10 - Try Trials

Video Duration: 3:01 **9 Questions**

Sabrina shows us how to use Trials to figure out what the problems are with our solutions.

Click the icon to play:

YouTube **Kahoot!** **Quizizz**

Crash Course Kids

#11 - Succeed by Failing

Video Duration: 4:06 **10 Questions**

Sabrina chats to us about failure points and how they can help us find better solutions to problems.

Click the icon to play:

YouTube **Kahoot!** **Quizizz**

Crash Course Kids

#12 - Fixing Failure Points

Video Duration: 4:02 **11 Questions**

In this episode, Sabrina shows us how to set up models and trials to find and fix failure points.

Click the icon to play:

YouTube **Kahoot!** **Quizizz**

Crash Course Kids

#13 - Designing a Trial

Video Duration: 4:35 **12 Questions**

We need to design trials to find failure points and see how things are going to work in the real world (with gravity, wind, and human error all factored in).

Click the icon to play:

YouTube Kahoot! Quizizz

Crash Course Kids

#14 - Testing and Trials

Video Duration: 4:44 **9 Questions**

This time, we need to figure out what to do if you don't have all the things you'd like to have to perform your tests.

Click the icon to play:

YouTube Kahoot! Quizizz

Crash Course Kids

#15 - The Robot Challenge

Video Duration: 4:27 **11 Questions**

In this episode, Sabrina shares a problem with us that can probably be solved by building an awesome robot.

Click the icon to play:

YouTube Kahoot! Quizizz

Crash Course Kids

#16 - Architecture Adventure

Video Duration: 4:27 **9 Questions**

If we want to build a place for us to hang out, we're going to need a special kind of engineering called architecture.

Click the icon to play:

YouTube **Kahoot!** **Quizizz**

Crash Course Kids

#17 - Let's Build a City

Video Duration: 4:13 **9 Questions**

In this episode, Sabrina shows us what we need to think about when we start engineering something as huge and full of problems as a city!

Click the icon to play:

YouTube **Kahoot!** **Quizizz**

Crash Course Kids

#18 - The End Is Only The Beginning

Video Duration: 4:24 **15 Questions**

Sabrina takes us on a tour of some of the ideas we've talked about and how they fit into our lives.

Click the icon to play:

YouTube **Kahoot!** **Quizizz**

Details for New Users

Welcome to IQ - Interactive Quizzes, engaging formative assessment tools based on freely available, high-quality video content.

Most of the small images in this document are embedded with related internet hyperlinks. Please ensure that you're using a PDF viewer that supports these features.

For ease of navigation, especially in large IQ documents, bookmarks are included. Look for this feature in your PDF viewer.

To aid in time management, each of the IQ episodes includes details on the video length and number of quiz questions. Brief details are included in the description, with further details available on the YouTube site.

Each quiz is available using two separate platforms, Kahoot and Quizizz, and every multiple-choice question includes a related screenshot from the video.

Kahoot is a game-based classroom response system, best played in a group setting, with the questions displayed on a shared screen (such as a whiteboard or screen projection). Responses are entered using any device that supports a web browser. The teacher can control the pace of the questions, see real-time results, and pause after viewing responses to provide further explanation.

With Quizizz, no projector is necessary. With the option to assign quizzes as "homework", students can play anytime. Players see questions and answer options on their own screen, and independently control the pace of the quiz. This format is ideal for early-arrivers, for use in learning stations and for assignment outside of the classroom.

On signing up for free accounts, both of these platforms provide further benefits for tracking and analyzing player results. Links for effective use of these platforms are provided at the end of this document.

I hope you enjoy playing these Interactive Quizzes with your students as much as I do.

Kind Regards,
Ron F.

Next Generation Science Standards*

Domain:
Engineering, Technology, and Applications of Science (ETS)

Topic Arrangement:
3-5-ETS1 Engineering Design

The Crash Course videos and Interactive Quizzes in this series directly relate, and/or provide supporting concepts, to the following Grade 5 Performance Expectations and Disciplinary Core Ideas:

3-5-ETS1-1 Engineering Design
Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.

3-5-ETS1-2 Engineering Design
Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.

3-5-ETS1-3 Engineering Design
Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.

ETS1.A: Defining and Delimiting Engineering Problems
Possible solutions to a problem are limited by available materials and resources (constraints). The success of a designed solution is determined by considering the desired features of a solution (criteria). Different proposals for solutions can be compared on the basis of how well each one meets the specified criteria for success or how well each takes the constraints into account. (3-5-ETS1-1)

ETS1.B: Developing Possible Solutions
Tests are often designed to identify failure points or difficulties, which suggest the elements of the design that need to be improved. (3-5-ETS1-3)

ETS1.C: Defining and Delimiting Engineering Problems
Different solutions need to be tested in order to determine which of them best solves the problem, given the criteria and the constraints. (3-5-ETS1-3)

Printable Checklist

Crash Course Kids

Engineering, Technology, and Applications of Science - ETS

Engineering Design

No.	Title	YouTube	Kahoot!	Quizizz	Date, Notes
#1	What's an Engineer?	☐ _____	☐ _____	☐ _____	_____
#2	The Engineering Process	☐ _____	☐ _____	☐ _____	_____
#3	Defining a Problem	☐ _____	☐ _____	☐ _____	_____
#4	Defining Success	☐ _____	☐ _____	☐ _____	_____
#5	Got Some Solutions?	☐ _____	☐ _____	☐ _____	_____
#6	Let's Fly!	☐ _____	☐ _____	☐ _____	_____
#7	A Case of "What-Ifs"	☐ _____	☐ _____	☐ _____	_____
#8	Engineering Games	☐ _____	☐ _____	☐ _____	_____
#9	Bowled Over	☐ _____	☐ _____	☐ _____	_____
#10	Try Trials	☐ _____	☐ _____	☐ _____	_____
#11	Succeed by Failing	☐ _____	☐ _____	☐ _____	_____
#12	Fixing Failure Points	☐ _____	☐ _____	☐ _____	_____
#13	Designing a Trial	☐ _____	☐ _____	☐ _____	_____
#14	Testing and Trials	☐ _____	☐ _____	☐ _____	_____
#15	The Robot Challenge	☐ _____	☐ _____	☐ _____	_____
#16	Architecture Adventure	☐ _____	☐ _____	☐ _____	_____
#17	Let's Build a City	☐ _____	☐ _____	☐ _____	_____
#18	The End Is Only The Beginning	☐ _____	☐ _____	☐ _____	_____

Get A Free IQ Product!

Teachers thrive on resources that save them time. Creators thrive on thoughtful feedback and incentives to create more resources. Please offer me a small piece of your precious time.

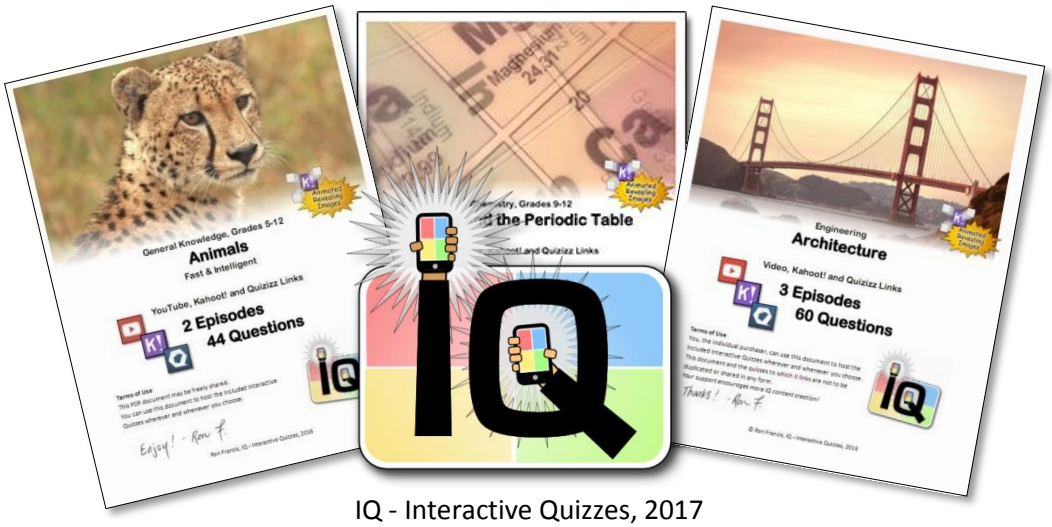
If you conduct yourself by the honor system, and can follow a few short instructions, I'm happy to show my appreciation.

Step 1:
Visit the current product page on TpT.
Access it quickly by clicking the cover image, shown on the right.

Step 2:
Scroll down the page, until you come to the **"Comments and Ratings" section: Complete the process with six clicks and a quick comment.** Remember, by commenting, you earn extra credits toward future purchases.

Step 3:
Consider following me. There's no obligation, but at least pause and consider it. As a follower, you'll be instantly informed of new product releases and sales. Paid products are released at discounted prices for the first 24 hours. If you think the time savings may be worth it in the long run, then click on the yellow worm on the cover page of this PDF, and also scroll back to the top of the TpT product page and click the green star to change the words to "Following".

Thanks! Please click the large IQ Logo below. I plan to rotate through all of the products shown below on my site, and possibly more. At least one will always be available. Please continue to complete the feedback instructions on my other products!

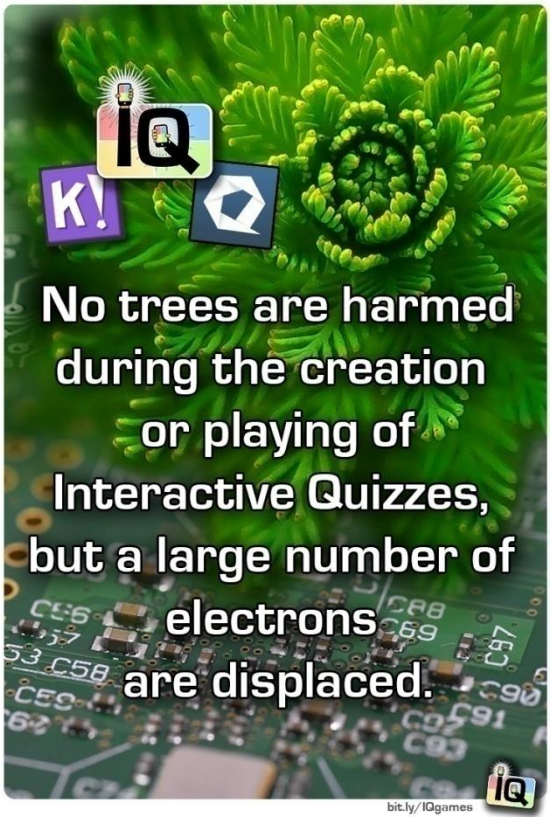


Printable - Video Worksheets

The questions that appear on the following pages are modified or abridged to fit the format of a single page per episode.

THE FOLLOWING PAGES KILL TREES

Please consider transitioning to the Interactive Quizzes on the preceding pages. By randomizing the IQ questions, they can be used numerous times with the same students (including for pre-assessment and regular review), all with little impact on the environment.



Within Quizizz, feel free to print the questions, and even copy and paste them into your own documents, for personal classroom use.

Printable Video Worksheet - Engineering Design

Name _____

Crash Course Kids

Date _____

#1 - What's an Engineer?

Before you begin ...

List one thing you know and one thing you want to know about someone who designs and builds things.

1. A person who designs and builds things to solve specific problems is _____
2. A plan produced to show the workings of an object, before it's built, is called _____
3. Where is the Golden Gate Bridge located? _____
4. Someone who designs and constructs buildings, roads and bridges is called _____
5. Someone who designs circuits, computer chips and microwave ovens is called _____
6. Someone that solves problems involving tools, engines and machines is _____
7. What kind of engineer is Marissa Mayer, the president of Yahoo? _____
8. Someone that solves problems by writing programs on a computer is _____
9. No matter what kind of engineer someone is, their job at its most basic level is _____
10. Someone that designs and constructs planes and spacecraft is _____

List two things that you learned.

Printable Answer Key - Engineering Design

Name _____

Crash Course Kids

Date _____

#1 - What's an Engineer?

Before you begin ...

List one thing you know and one thing you want to know about someone who designs and builds things.

1. A person who designs and builds things to solve specific problems is _____

   A. an engineer

2. A plan produced to show the workings of an object, before it's built, is called _____

   A. a design

3. Where is the Golden Gate Bridge located?

   A. San Francisco, California

4. Someone who designs and constructs buildings, roads and bridges is called _____

   A. a civil engineer

5. Someone who designs circuits, computer chips and microwave ovens is called _____

   A. an electrical engineer

6. Someone that solves problems involving tools, engines and machines is _____

   A. a mechanical engineer

7. What kind of engineer is Marissa Mayer, the president of Yahoo?

   A. a software engineer

8. Someone that solves problems by writing programs on a computer is _____

   A. a software engineer

9. No matter what kind of engineer someone is, their job at its most basic level is _____

   A. problem-solving

10. Someone that designs and constructs planes and spacecraft is _____

    A. an aerospace engineer

List two things that you learned.

Printable Video Worksheet - Engineering Design

Name _____

Crash Course Kids

Date _____

#2 - The Engineering Process

Before you begin ...

List one activity that you do in steps. Should it always be done in a particular order? Why or why not?

1. Engineers are people who design and build things to solve _____

2. When solving problems, the series of steps that engineers follow is called _____

3. Before you can solve a problem, the first thing you have to do is _____

4. In the 1800s, an engineer named Alexander Graham Bell invented _____

5. Once you've figured out what problem you want to tackle, you need to _____

6. The chemist and engineer Alfred Nobel invented _____

7. After your research is done, this is where you _____

8. In which step would you most likely get to draw? _____

9. A simple model that lets you test out your design is called _____

10. Who tested prototypes for years while inventing modern air conditioning? _____

List two things that you learned.

Printable Answer Key - Engineering Design

Name _____

Crash Course Kids

Date _____

#2 - The Engineering Process

Before you begin ...

List one activity that you do in steps. Should it always be done in a particular order? Why or why not?

1. Engineers are people who design and build things to solve _____

   A. problems

2. When solving problems, the series of steps that engineers follow is called _____

   A. the engineering process

3. Before you can solve a problem, the first thing you have to do is _____

   A. define the problem

4. In the 1800s, an engineer named Alexander Graham Bell invented _____

   A. the telephone

5. Once you've figured out what problem you want to tackle, you need to _____

   A. do your research

6. The chemist and engineer Alfred Nobel invented _____

   A. dynamite

7. After your research is done, this is where you _____

   A. develop a possible solution

8. In which step would you most likely get to draw?

   A. design your solution

9. A simple model that lets you test out your design is called _____

   A. a prototype

10. Who tested prototypes for years while inventing modern air conditioning?

    A. Willis Carrier

List two things that you learned.

Printable Video Worksheet - Engineering Design

Name _____

Crash Course Kids

Date _____

#3 - Defining a Problem

Before you begin ...

List one thing you know and one thing you want to know about understanding problems.

1. People who study how things work, and also design and build things are called _____

2. A person who designs and builds tools, engines and machines is _____

3. A person who uses computers to write programs is _____

4. A person who designs and constructs buildings, roads and bridges is _____

5. When trying to solve a problem, engineers follow a series of steps called _____

6. When an engineer wants to identify the problem, they typically _____

7. To get to the other side of the canyon, why is it not possible to cross the bridge? _____

8. The question "How do I fly across this very big canyon?" was called _____

9. A key to being a good engineer is defining the problem _____

10. An engineer asks a lot of questions to define a problem _____

List two things that you learned.

Printable Answer Key - Engineering Design

Name _____

Crash Course Kids

Date _____

#3 - Defining a Problem

Before you begin ...

List one thing you know and one thing you want to know about understanding problems.

1. People who study how things work, and also design and build things are called _____
   A. engineers
2. A person who designs and builds tools, engines and machines is _____
   A. a mechanical engineer
3. A person who uses computers to write programs is _____
   A. a software engineer
4. A person who designs and constructs buildings, roads and bridges is _____
   A. a civil engineer
5. When trying to solve a problem, engineers follow a series of steps called _____
   A. the engineering process
6. When an engineer wants to identify the problem, they typically _____
   A. ask a lot of questions
7. To get to the other side of the canyon, why is it not possible to cross the bridge?
   A. there's no bridge
8. The question "How do I fly across this very big canyon?" was called _____
   A. a solvable problem
9. A key to being a good engineer is defining the problem _____
   A. in a solvable way
10. An engineer asks a lot of questions to define a problem _____
    A. as specifically as they can

List two things that you learned.

Printable Video Worksheet - Engineering Design

Name _____

Crash Course Kids

Date _____

#4 - Defining Success

Before you begin ...

List one thing you know and one thing you want to know about knowing when you've achieved success.

1. The step of identifying a problem to solve is called _____
2. When engineers define success, they do it in relation to _____
3. Something an engineer designs or builds to solve a problem is called _____
4. A safe solution to not being able to see at night was _____
5. Identifying the criteria for a successful solution can be done using _____
6. What does Sabrina have to help her get to the other side of the canyon? _____
7. What does Sabrina plan to build using pieces from her tent? _____
8. The most successful solution is one that _____
9. The solution that meets all or most of the criteria is the one that engineers will _____
10. Engineering always starts with _____

List two things that you learned.

Printable Answer Key - Engineering Design

Name _____

Crash Course Kids

Date _____

#4 - Defining Success

Before you begin ...

List one thing you know and one thing you want to know about knowing when you've achieved success.

1. The step of identifying a problem to solve is called _____

   A. defining a problem

2. When engineers define success, they do it in relation to _____

   A. the problem they're trying to solve

3. Something an engineer designs or builds to solve a problem is called _____

   A. a solution

4. A safe solution to not being able to see at night was _____

   A. light bulbs

5. Identifying the criteria for a successful solution can be done using _____

   A. a checklist

6. What does Sabrina have to help her get to the other side of the canyon?

   A. a tent

7. What does Sabrina plan to build using pieces from her tent?

   A. a hang glider

8. The most successful solution is one that _____

   A. meets all of the criteria

9. The solution that meets all or most of the criteria is the one that engineers will _____

   A. attempt to design

10. Engineering always starts with _____

    A. a problem that needs to be solved

List two things that you learned.

Printable Video Worksheet - Engineering Design

Name _____

Crash Course Kids

Date _____

#5 - Got Some Solutions?

Before you begin ...

List one thing you know and one thing you want to know about finding solutions to problems.

1. An engineer is a person who designs and builds things to _____
2. The series of steps that engineers use to guide them is called _____
3. As was previously decided, what was one possible way to traverse the gap? _____
4. When confronted with a problem, we should try to come up with _____
5. How might Sabrina use balloons in the solution to her problem? _____
6. Balloons might lift the tent, much like they lifted characters in the movie _____
7. As a solution to her problem, Sabrina proposed using the umbrella _____
8. Using an umbrella to fly worked for _____
9. We don't know if a proposed solution will actually work until _____
10. Usually, how many potential ways are there to solve any given problem? _____

List two things that you learned.

Printable Answer Key - Engineering Design

Name _____

Crash Course Kids

Date _____

#5 - Got Some Solutions?

Before you begin ...

List one thing you know and one thing you want to know about finding solutions to problems.

1. An engineer is a person who designs and builds things to _____

   A. solve specific problems

2. The series of steps that engineers use to guide them is called _____

   A. the engineering process

3. As was previously decided, what was one possible way to traverse the gap?

   A. build a hang glider

4. When confronted with a problem, we should try to come up with _____

   A. more than one solution

5. How might Sabrina use balloons in the solution to her problem?

   A. they can carry her over the gorge

6. Balloons might lift the tent, much like they lifted characters in the movie _____

   A. Up

7. As a solution to her problem, Sabrina proposed using the umbrella _____

   A. to float or fly across the gorge

8. Using an umbrella to fly worked for _____

   A. Mary Poppins

9. We don't know if a proposed solution will actually work until _____

   A. the evaluating stage

10. Usually, how many potential ways are there to solve any given problem?

    A. many

List two things that you learned.

Printable Video Worksheet - Engineering Design

Name _____

Crash Course Kids

Date _____

#6 - Let's Fly!

Before you begin ...

List one thing you know and one thing you want to know about finding the best solution to a problem.

1. A person who designs and builds things to solve specific problems is called _____
2. The engineering process is a series of steps used to guide engineers toward _____
3. For a single problem, how many solutions do engineers always brainstorm? _____
4. A quality of an idea that is regarded as good or beneficial is known as _____
5. A quality of an idea that is regarded as a disadvantage or fault is known as _____
6. The balloon-powered air lift requires materials we don't have, like _____
7. As an engineer, it's important to _____
8. What type of solutions won't work for real engineers? _____
9. Before they actually let someone try the hang glider, engineers would _____
10. If for some reason the hang glider didn't work, the engineer would _____

List two things that you learned.

Printable Answer Key - Engineering Design

Name _____

Crash Course Kids

Date _____

#6 - Let's Fly!

Before you begin ...

List one thing you know and one thing you want to know about finding the best solution to a problem.

1. A person who designs and builds things to solve specific problems is called _____
   A. an engineer
2. The engineering process is a series of steps used to guide engineers toward _____
   A. solutions
3. For a single problem, how many solutions do engineers always brainstorm? _____
   A. more than one solution
4. A quality of an idea that is regarded as good or beneficial is known as _____
   A. a strength
5. A quality of an idea that is regarded as a disadvantage or fault is known as _____
   A. a weakness
6. The balloon-powered air lift requires materials we don't have, like _____
   A. a helium tank
7. As an engineer, it's important to _____
   A. think big
8. What type of solutions won't work for real engineers?
   A. pretend solutions
9. Before they actually let someone try the hang glider, engineers would _____
   A. test it many, many times
10. If for some reason the hang glider didn't work, the engineer would _____
    A. come up with more possible solutions

List two things that you learned.

Printable Video Worksheet - Engineering Design

Name _____

Crash Course Kids

Date _____

#7 - A Case of "What-Ifs"

Before you begin ...

List one thing you know and one thing you want to know about conditions or values that can change.

1. What kind of questions do engineers ask themselves every day? _____
2. Engineers use a series of steps known as the _____
3. We started by defining a solvable problem, in our case _____
4. We looked at more than one solution and chose a solution that _____
5. A condition or a value that can be changed is called _____
6. The height from which we drop a ball is _____
7. When dropping a ball, one thing we can't change is _____
8. When trying to traverse the gorge, one variable we can change is _____
9. When trying to hang glide across the canyon, one variable we can't control is _____
10. Once we've identified the possible variables, we can start _____

List two things that you learned.

Printable Answer Key - Engineering Design

Name _____

Crash Course Kids

Date _____

#7 - A Case of "What-Ifs"

Before you begin ...

List one thing you know and one thing you want to know about conditions or values that can change.

1. What kind of questions do engineers ask themselves every day?

   A. "what if" questions

2. Engineers use a series of steps known as the _____

   A. engineering process

3. We started by defining a solvable problem, in our case _____

   A. how can we get across the gorge?

4. We looked at more than one solution and chose a solution that _____

   A. met our criteria

5. A condition or a value that can be changed is called _____

   A. a variable

6. The height from which we drop a ball is _____

   A. a variable we can change

7. When dropping a ball, one thing we can't change is _____

   A. the gravity that pulls on the ball

8. When trying to traverse the gorge, one variable we can change is _____

   A. the weight of our hang glider

9. When trying to hang glide across the canyon, one variable we can't control is _____

   A. the speed of the wind

10. Once we've identified the possible variables, we can start _____

    A. asking "what if" questions

List two things that you learned.

Printable Video Worksheet - Engineering Design

Name _____

Crash Course Kids

Date _____

#8 - Engineering Games

Before you begin ...

What is your favorite game?

What things have you learned while playing a game?

1. As any good gamer or engineer knows, _____
2. A condition or value that can be changed is called _____
3. We can control some variables, like _____
4. We can't control some variables, like _____
5. The way something turns out is called _____
6. When launching Catbot, the angle of the launch is _____
7. When launching Catbot, we can change _____
8. In repeated trials, engineers only change _____
9. In general, changing a variable can affect _____
10. Engineers change only one variable at a time, to establish a connection between _____

List two things that you learned.

Printable Answer Key - Engineering Design

Name _____

Crash Course Kids

Date _____

#8 - Engineering Games

Before you begin ...

What is your favorite game?

What things have you learned while playing a game?

1. As any good gamer or engineer knows, _____

   A. it takes the right move to win

2. A condition or value that can be changed is called _____

   A. a variable

3. We can control some variables, like _____

   A. the height from which we drop a ball

4. We can't control some variables, like _____

   A. the gravity that pulls the ball down

5. The way something turns out is called _____

   A. an outcome

6. When launching Catbot, the angle of the launch is _____

   A. a variable we can change

7. When launching Catbot, we can change _____

   A. how far we pull back on the slingshot

8. In repeated trials, engineers only change _____

   A. one variable at a time

9. In general, changing a variable can affect _____

   A. the outcome

10. Engineers change only one variable at a time, to establish a connection between _____

    A. the variable and the outcome

List two things that you learned.

Printable Video Worksheet - Engineering Design

Name _____

Crash Course Kids

Date _____

#9 - Bowled Over - Isolating Variables

Before you begin ...

List one thing you know and one thing you want to know about using variables.

1. What's great about engineers? _____
2. Engineers always approach testing with _____
3. In the slingshot game, we decided that we could change one of two _____
4. In repeated trials, we should _____
5. When you choose one, and only one, variable to change, it's called _____
6. Rules or tests that are used to judge something are called _____
7. In the bowling game, knocking down the pins and doing it all in one turn were _____
8. To isolate a variable, we have to make sure that all of the other possible variables _____
9. In the bowling game, we wanted our isolated variable to be _____
10. By using a ball ramp, which variable is kept the same? _____

List two things that you learned.

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Name _____

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#9 - Bowled Over - Isolating Variables

Before you begin ...

List one thing you know and one thing you want to know about using variables.

1. What's great about engineers?

A. They solve all kinds of problems

2. Engineers always approach testing with _____

A. a plan

3. In the slingshot game, we decided that we could change one of two _____

A. variables

4. In repeated trials, we should _____

A. change only one variable at a time

5. When you choose one, and only one, variable to change, it's called _____

A. isolating a variable

6. Rules or tests that are used to judge something are called _____

A. criteria

7. In the bowling game, knocking down the pins and doing it all in one turn were _____

A. criteria for success

8. To isolate a variable, we have to make sure that all of the other possible variables _____

A. stay the exact same

9. In the bowling game, we wanted our isolated variable to be _____

A. the angle that we threw the ball

10. By using a ball ramp, which variable is kept the same?

A. the speed of the ball

List two things that you learned.

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#10 - Try Trials

Before you begin ...

List one thing you know and one thing you want to know about figuring out problems.

1. Variables are conditions or values that can be _____
2. In bowling, knocking down the pins and doing it in just one turn are _____
3. As good engineers we are going to choose one variable and _____
4. When the value of a variable doesn't change, it's said to be _____
5. In order to isolate a variable, we have to ensure that the other variables are _____
6. When both criteria are met, the result is _____
7. An important part of the process used by engineers is _____
8. Engineers isolate one variable to test then, between trials, they _____
9. In general, if the criteria for success are met then the solution is _____

List two things that you learned.

Printable Answer Key - Engineering Design

Name _____

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#10 - Try Trials

Before you begin ...

List one thing you know and one thing you want to know about figuring out problems.

1. Variables are conditions or values that can be _____

   A. changed

2. In bowling, knocking down the pins and doing it in just one turn are _____

   A. criteria for a strike

3. As good engineers we are going to choose one variable and _____

   A. isolate it

4. When the value of a variable doesn't change, it's said to be _____

   A. constant

5. In order to isolate a variable, we have to ensure that the other variables are _____

   A. constant

6. When both criteria are met, the result is _____

   A. a strike

7. An important part of the process used by engineers is _____

   A. doing several trials

8. Engineers isolate one variable to test then, between trials, they _____

   A. change that variable

9. In general, if the criteria for success are met then the solution is _____

   A. a winner

List two things that you learned.

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#11 - Succeed by Failing

Before you begin ...

List one thing you know and one thing you want to know about success and failure.

1. There's a common expression: "If at first you don't succeed, _____"
2. If you think about it, you can't try again without _____
3. A condition or test that's part of a larger experiment is called _____
4. The point where a solution doesn't work anymore is called _____
5. For the collapsing bridge across a stream, the suggested failure point was _____
6. The point where an engineer can say, "Here's why the bridge failed" is called _____
7. What was the nickname of the original Tacoma Narrows Bridge? _____
8. The failure point of the original Tacoma Narrows Bridge was _____
9. Eventually, what happened to the original Tacoma Narrows Bridge? _____
10. Suspension bridges are stronger and safer than ever because engineers _____

List two things that you learned.

Printable Answer Key - Engineering Design

Name _____

Crash Course Kids

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#11 - Succeed by Failing

Before you begin ...

List one thing you know and one thing you want to know about success and failure.

1. There's a common expression: "If at first you don't succeed, _____"

   A. try, try again

2. If you think about it, you can't try again without _____

   A. failing first

3. A condition or test that's part of a larger experiment is called _____

   A. a trial

4. The point where a solution doesn't work anymore is called _____

   A. a failure point

5. For the collapsing bridge across a stream, the suggested failure point was _____

   A. the specific weight on the bridge

6. The point where an engineer can say, "Here's why the bridge failed" is called _____

   A. the failure point

7. What was the nickname of the original Tacoma Narrows Bridge?

   A. Galloping Gertie

8. The failure point of the original Tacoma Narrows Bridge was _____

   A. the speed and angle of the wind

9. Eventually, what happened to the original Tacoma Narrows Bridge?

   A. it collapsed

10. Suspension bridges are stronger and safer than ever because engineers _____

    A. learn from previous failures

List two things that you learned.

Printable Video Worksheet - Engineering Design

Name _____

Crash Course Kids

Date _____

#12 - Fixing Failure Points

Before you begin ...

List one thing you know and one thing you want to know about setting up models and trials.

1. When a solution to a problem doesn't work anymore, it's called _____
2. Engineers have to be able to spot failure points, and then try to _____
3. An organized series of steps used to accomplish a goal is called _____
4. A condition or test that's part of a larger experiment is called _____
5. A place where a solution to a problem doesn't work anymore is called _____
6. One way that engineers test a solution in its early stages is to build a small _____
7. A specific weight at which the bridge is no longer a good solution is called _____
8. After the failure, what was added to the model bridge before the new trial? _____
9. In 1940, what was built to get people across Puget Sound? _____
10. For Galloping Gertie, the speed and angle of the wind were the bridge's _____

List two things that you learned.

Printable Answer Key - Engineering Design

Name _____

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#12 - Fixing Failure Points

Before you begin ...

List one thing you know and one thing you want to know about setting up models and trials.

1. When a solution to a problem doesn't work anymore, it's called _____
   A. a failure point
2. Engineers have to be able to spot failure points, and then try to _____
   A. fix their solution
3. An organized series of steps used to accomplish a goal is called _____
   A. a plan
4. A condition or test that's part of a larger experiment is called _____
   A. a trial
5. A place where a solution to a problem doesn't work anymore is called _____
   A. a failure point
6. One way that engineers test a solution in its early stages is to build a small _____
   A. model
7. A specific weight at which the bridge is no longer a good solution is called _____
   A. a failure point
8. After the failure, what was added to the model bridge before the new trial?
   A. extra support
9. In 1940, what was built to get people across Puget Sound?
   A. the Tacoma Narrows Bridge
10. For Galloping Gertie, the speed and angle of the wind were the bridge's _____
    A. failure point

List two things that you learned.

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#13 - Designing a Trial

Before you begin ...

List one thing you know and one thing you want to know about factors that make things fail.

1. When engineers design a solution to a problem, they focus on _____
2. In order to make sure that a solution meets a specific outcome, engineers _____
3. The criteria are the rules we use to _____
4. Conditions that could change over the course of an experiment are called _____
5. When we launched Catbot into a pile of marshmallows, we only changed _____
6. The places where a solution doesn't work anymore are called _____
7. Getting a ring around the pin, and doing it in one throw are the _____
8. The size of the ring, and the distance we can stand away from the pin are _____
9. In the ring toss game, which variable are we unable to change? _____
10. In the ring toss game, we first chose to isolate _____

List two things that you learned.

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Name _____

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#13 - Designing a Trial

Before you begin ...

List one thing you know and one thing you want to know about factors that make things fail.

1. When engineers design a solution to a problem, they focus on _____
   A. a specific outcome
2. In order to make sure that a solution meets a specific outcome, engineers _____
   A. do a bunch of trials
3. The criteria are the rules we use to _____
   A. judge a solution
4. Conditions that could change over the course of an experiment are called _____
   A. variables
5. When we launched Catbot into a pile of marshmallows, we only changed _____
   A. the angle of the slingshot
6. The places where a solution doesn't work anymore are called _____
   A. failure points
7. Getting a ring around the pin, and doing it in one throw are the _____
   A. criteria for success
8. The size of the ring, and the distance we can stand away from the pin are _____
   A. variables we can change
9. In the ring toss game, which variable are we unable to change?
   A. the pull of gravity
10. In the ring toss game, we first chose to isolate _____
    A. the size of the ring

List two things that you learned.

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#14 - Testing and Trials

Before you begin ...

List one thing you know and one thing you want to know about testing a design.

1. For a given problem, engineers sometimes figure out more than one way to _____
2. Getting the ring around the pin, and doing it in one toss were _____
3. The conditions that can change, and that can affect our outcome, are called _____
4. Previously, with the ring toss game, which variable had we decided to isolate? _____
5. A great way to organize information from multiple tests is to use _____
6. For the first test using the table, which variable was isolated? _____
7. If we wanted to, we can mix and match to create any combination of _____
8. Between trials, we only change _____
9. It's possible to design several different tests that lead to the same _____

List two things that you learned.

Printable Answer Key - Engineering Design

Name _____

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Date _____

#14 - Testing and Trials

Before you begin ...

List one thing you know and one thing you want to know about testing a design.

1. For a given problem, engineers sometimes figure out more than one way to _____
   A. reach a solution
2. Getting the ring around the pin, and doing it in one toss were _____
   A. the criteria for success
3. The conditions that can change, and that can affect our outcome, are called _____
   A. variables
4. Previously, with the ring toss game, which variable had we decided to isolate?
   A. the ring size
5. A great way to organize information from multiple tests is to use _____
   A. tables
6. For the first test using the table, which variable was isolated?
   A. the distance from the pin
7. If we wanted to, we can mix and match to create any combination of _____
   A. variables
8. Between trials, we only change _____
   A. one variable at a time
9. It's possible to design several different tests that lead to the same _____
   A. outcome

List two things that you learned.

Printable Video Worksheet - Engineering Design

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Date _____

#15 - The Robot Challenge

Before you begin ...

List one thing you know and one thing you want to know about robots.

1. Who can you thank for designing and building bridges, hang gliders and calculators? _____

2. The set of steps used to solve technical problems is called _____

3. Stating "I need a way to retrieve my phone" completed which step of the process? _____

4. Which idea was chosen as the best possible solution to the problem? _____

5. Including a camera and a suction cup were part of which engineering step? _____

6. During the testing stage, the small experiments are known as _____

7. For the trials to be really useful, what must be done with the variables? _____

8. Conditions that remain constant throughout the experiment are called _____

9. If the robot crashes when carrying the weight of the phone, that would be _____

10. Until we get the outcome we're looking for, we'll keep _____

List two things that you learned.

Printable Answer Key - Engineering Design

Name _____

Crash Course Kids

Date _____

#15 - The Robot Challenge

Before you begin ...

List one thing you know and one thing you want to know about robots.

1. Who can you thank for designing and building bridges, hang gliders and calculators?

   A. engineers

2. The set of steps used to solve technical problems is called _____

   A. the engineering process

3. Stating "I need a way to retrieve my phone" completed which step of the process?

   A. defining the problem

4. Which idea was chosen as the best possible solution to the problem?

   A. build a robot

5. Including a camera and a suction cup were part of which engineering step?

   A. designing a solution

6. During the testing stage, the small experiments are known as _____

   A. trials

7. For the trials to be really useful, what must be done with the variables?

   A. isolate them

8. Conditions that remain constant throughout the experiment are called _____

   A. fixed variables

9. If the robot crashes when carrying the weight of the phone, that would be _____

   A. a failure point

10. Until we get the outcome we're looking for, we'll keep _____

    A. tweaking the variables

List two things that you learned.

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#16 - Architecture Adventure

Before you begin ...

List one thing you know and one thing you want to know about building a treehouse.

1. The first step in the engineering process is to _____
2. Being "secluded", "quiet" and "private" are some of the _____
3. Hanging blankets in Sabrina's room were proposed mainly to _____
4. Hanging a sign on Sabrina's door was proposed mainly to _____
5. Engineers that design buildings are commonly known as _____
6. On the treehouse design, the drop-down rope ladder was proposed for _____
7. The size and weight of the tree house are really important _____
8. A weight of the treehouse, Sabrina, and a few friends might be a serious _____
9. What series of steps do architects follow when designing buildings? _____

List two things that you learned.

Printable Answer Key - Engineering Design

Name _____

Crash Course Kids

Date _____

#16 - Architecture Adventure

Before you begin ...

List one thing you know and one thing you want to know about building a treehouse.

1. The first step in the engineering process is to _____

   A. define the problem

2. Being "secluded", "quiet" and "private" are some of the _____

   A. success criteria

3. Hanging blankets in Sabrina's room were proposed mainly to _____

   A. block out sounds

4. Hanging a sign on Sabrina's door was proposed mainly to _____

   A. attempt privacy

5. Engineers that design buildings are commonly known as _____

   A. architects

6. On the treehouse design, the drop-down rope ladder was proposed for _____

   A. optimal privacy

7. The size and weight of the tree house are really important _____

   A. variables

8. A weight of the treehouse, Sabrina, and a few friends might be a serious _____

   A. failure point

9. What series of steps do architects follow when designing buildings?

   A. the engineering process

List two things that you learned.

Printable Video Worksheet - Engineering Design

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Crash Course Kids

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#17 - Let's Build a City

Before you begin ...

If you were designing a city, what important details would you want to include?

1. When designing a city, factors such as "safe", "healthy", "sustainable", and "fun" are _____
2. The kind of engineering that involves designing a city is called _____
3. Designing a city requires managing a lot of complicated interlocking _____
4. Tackling a huge technical project begins with the first step of _____
5. The job of a city planner is to create places for people to live that makes them _____
6. The location of a city will have a large effect on its _____
7. Factors such as roads, subways, bike paths and sidewalks involve systems of _____
8. By respecting the surrounding nature, your city will be good for _____
9. Cities are really complicated feats of _____

List two things that you learned.

Printable Answer Key - Engineering Design

Name _____

Crash Course Kids

Date _____

#17 - Let's Build a City

Before you begin ...

If you were designing a city, what important details would you want to include?

1. When designing a city, factors such as "safe", "healthy", "sustainable", and "fun" are _____
   A. criteria for success
2. The kind of engineering that involves designing a city is called _____
   A. urban planning
3. Designing a city requires managing a lot of complicated interlocking _____
   A. variables
4. Tackling a huge technical project begins with the first step of _____
   A. the engineering process
5. The job of a city planner is to create places for people to live that makes them _____
   A. happy
6. The location of a city will have a large effect on its _____
   A. available resources
7. Factors such as roads, subways, bike paths and sidewalks involve systems of _____
   A. transportation
8. By respecting the surrounding nature, your city will be good for _____
   A. the environment
9. Cities are really complicated feats of _____
   A. engineering

List two things that you learned.

Printable Video Worksheet - Engineering Design

Name _____

Crash Course Kids

Date _____

#18 - The End Is Only The Beginning

Before you begin ...

List one thing you know and one thing you want to know about science and engineering.

1. Plants get their energy from _____
2. All living things are connected by a chain of energy transfer called _____
3. Food chains are twisted and tangled in great, big _____
4. The place where a plant or animal normally lives is called their _____
5. Weather takes place in the Earth's _____
6. Solid, liquid and gas are the three states of _____
7. A group of stars that forms a particular shape in the sky is called _____
8. How long does it take for the Earth to orbit once around the Sun? _____
9. A person who designs and builds machines, systems, or structures is called _____
10. The technical process of designing cities is known as _____

List two things that you learned.

Printable Answer Key - Engineering Design

Name _____

Crash Course Kids

Date _____

#18 - The End Is Only The Beginning

Before you begin ...

List one thing you know and one thing you want to know about science and engineering.

1. Plants get their energy from _____

   A. the sun

2. All living things are connected by a chain of energy transfer called _____

   A. the food chain

3. Food chains are twisted and tangled in great, big _____

   A. food webs

4. The place where a plant or animal normally lives is called their _____

   A. habitat

5. Weather takes place in the Earth's _____

   A. atmosphere

6. Solid, liquid and gas are the three states of _____

   A. matter

7. A group of stars that forms a particular shape in the sky is called _____

   A. a constellation

8. How long does it take for the Earth to orbit once around the Sun?

   A. 365 days

9. A person who designs and builds machines, systems, or structures is called _____

   A. an engineer

10. The technical process of designing cities is known as _____

    A. urban planning

List two things that you learned.

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If you have any comments, suggestions or constructive feedback, please contact me at: **InteractiveQuizzes@gmail.com**

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About the Author:

Ron has been teaching math, science and computer science in Ontario public schools since 1997. He enjoys implementing educational technology in the classroom, learning along with students and sharing resources with colleagues.

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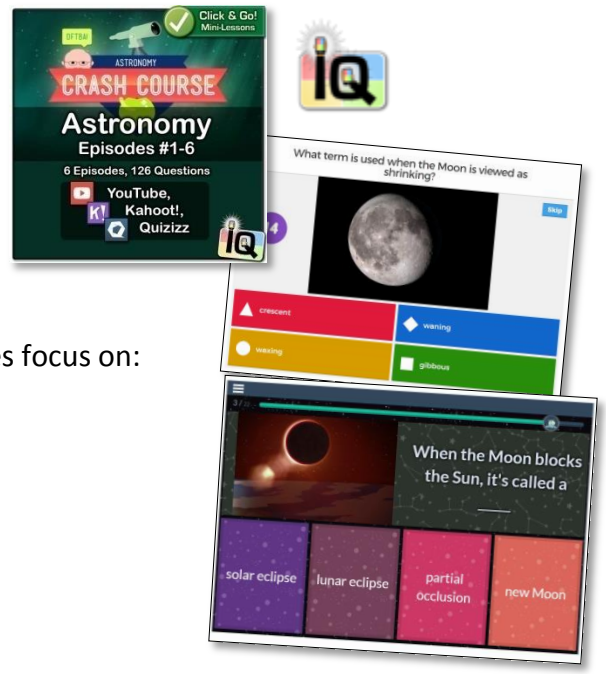
Recommended Resources

For more game-based learning, add these other Interactive Quizzes to your collection:

Crash Course
Astronomy
Episodes #1-6, hosted by Phil Plait

Video lessons on celestial objects and phenomena that originate outside Earth's atmosphere

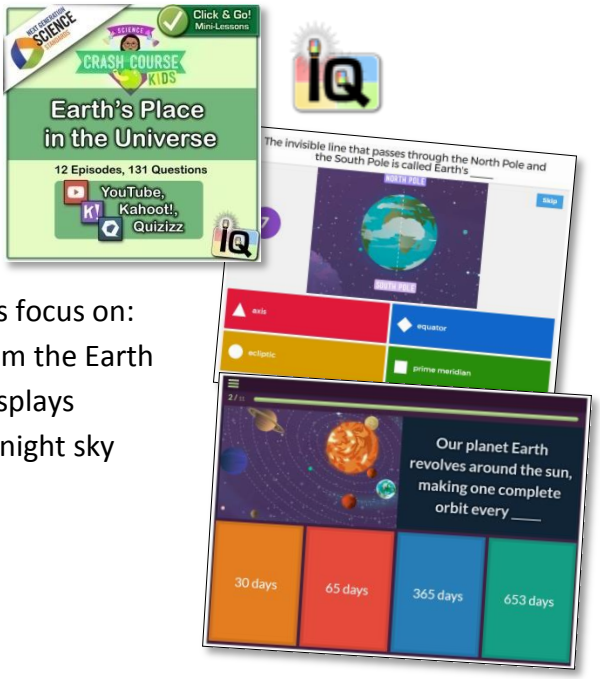


These Crash Course videos and Interactive Quizzes focus on:

- an introduction to astronomy
- naked eye observations
- cyclical phenomena that we can observe
- the cause and name of the Moon's phases
- solar and lunar eclipses
- how telescopes work

Crash Course Kids
Earth's Place in the Universe
Next Generation Science Standards:

5-ESS1-1, 5-ESS1-2, ESS1.A, ESS1.B



These Crash Course videos and Interactive Quizzes focus on:

- the sun and other stars, and their distance from the Earth
- revealing patterns using data and graphical displays
- the seasonal appearance of some stars in the night sky
- the orbits of Earth and the moon

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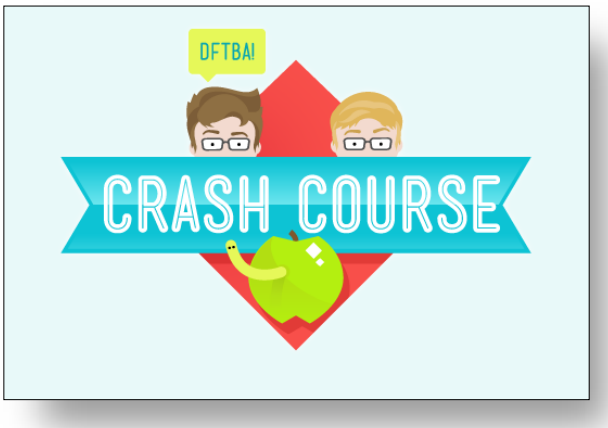

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