



Life as a Product Designer at Khan Academy

Elizabeth Lin • Berkeley Innovation • 11.10.2015



All the things I've learned since
“I've become a real person”

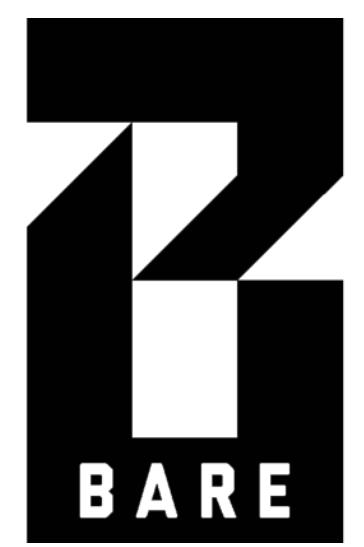
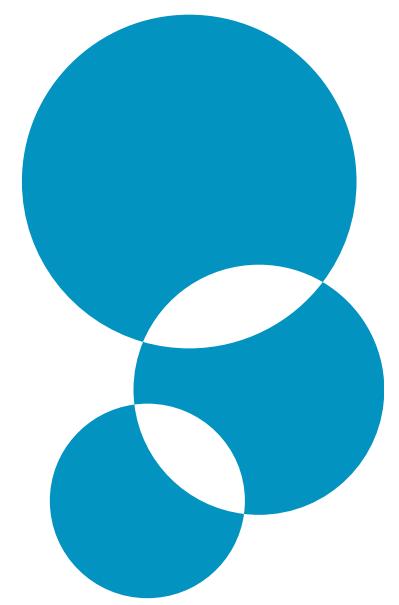
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A Lil Background





I did it 🎉





Enough ‘bout me



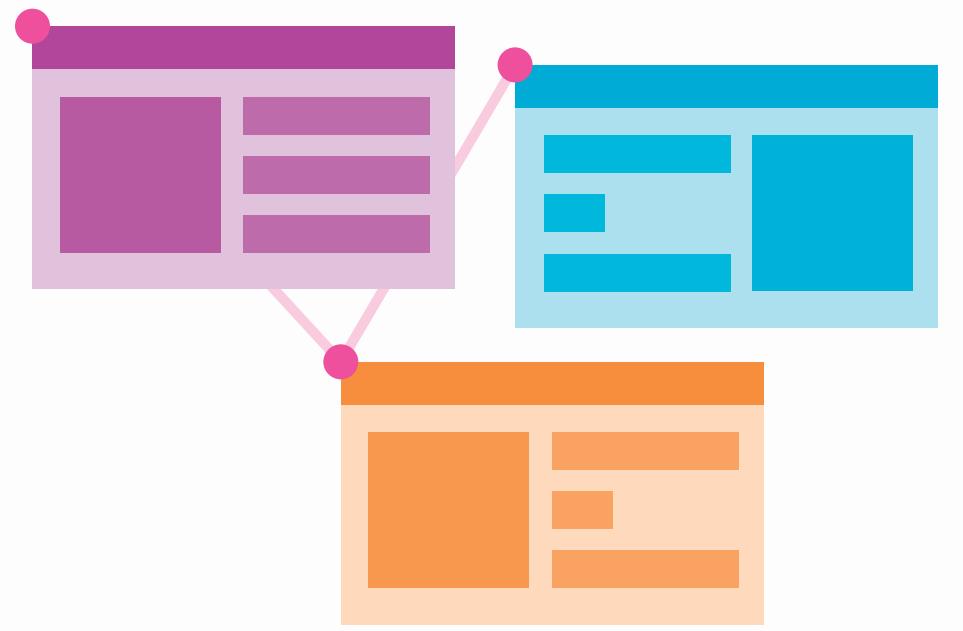




What is a product designer 🤔?

IN SHORT

*We design what you see, interact with, and experience within
the Khan Academy.*



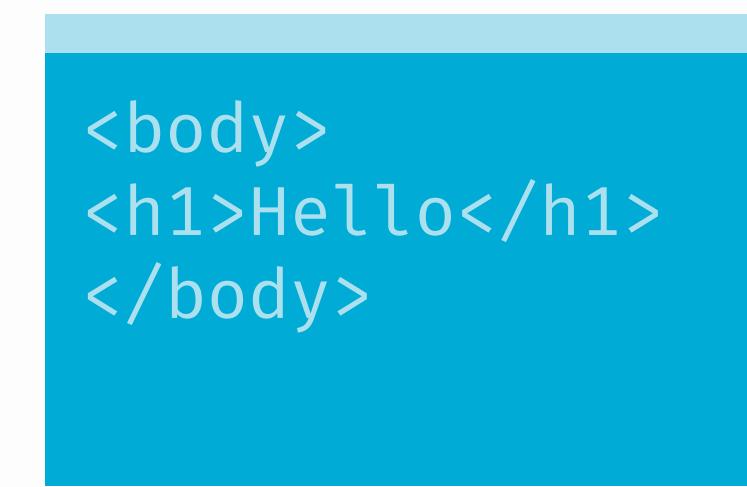
Systems design

User experience
Information architecture



Visual design

Graphic design
Illustration



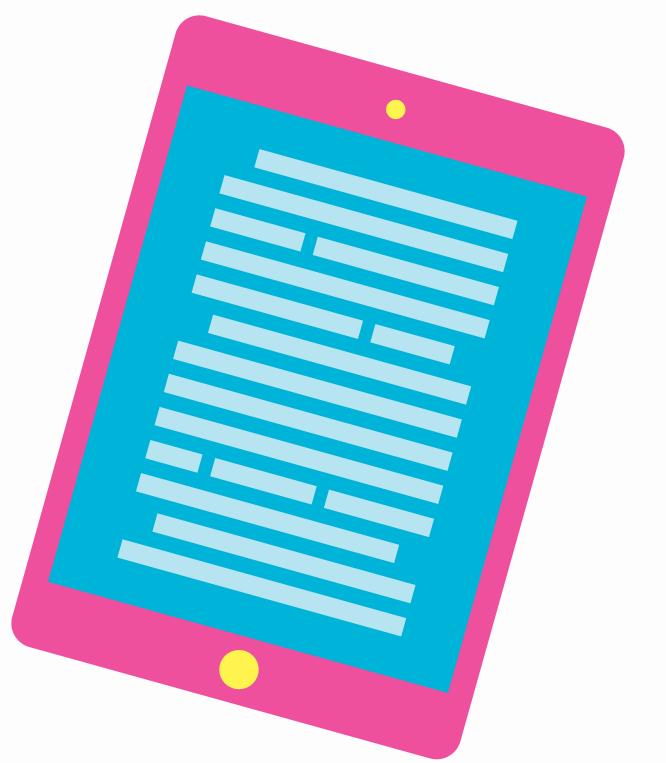
Production design

Front-end development
Prototyping

What do we work on ?



SAT



Mobile



Learnstorm



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(a) Redesigning our content library so that learners can quickly find the content they need



Bibliotron

(b) Redesigning our content library so that content creators can create flexible, and innovative new forms of learning

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Physics | Khan Academy

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Physics

Learn about the basic principles that govern the physical world around us. Solid understanding of algebra and a basic understanding of trigonometry necessary.

Help Requests

Community Questions

One-dimensional motion

In this tutorial we begin to explore ideas of velocity and acceleration. We do exciting things like throw things off cliffs (far safer on paper than in real life) and see how high a ball will fly in the air.

Two-dimensional motion

You understand velocity and acceleration well in one-dimension. Now we can explore scenarios that are even more fun. With a little bit of trigonometry (you might want to review your basic trig, especially what sin and cos are), we can think about whether a baseball can clear the "green monster" at Fenway Park.

Forces and Newton's laws of motion

This tutorial is the meat of much of classical physics. We think about what a force is and how Newton changed the world's (and possibly your) view of how reality works.

Work and energy

Work and energy. Potential energy. Kinetic energy. Mechanical advantage. Springs and Hooke's law.

Impacts and linear momentum

Linear momentum. Conservation of momentum. Elastic collisions.

One-dimensional motion | F X

https://www.khanacademy.org/science/physics/one-dimensional-motion

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◀ PHYSICS One-dimensional motion

ALL CONTENT IN "ONE-DIMENSIONAL MOTION"

Skill check for one-dimensional motion Skill check: One-dimensional motion

In this tutorial we begin to explore ideas of velocity and acceleration. We do exciting things like throw things off cliffs (far safer on paper than in real life) and see how high a ball will fly in the air.

Community Questions

Displacement, velocity, and time

This tutorial is the backbone of your understanding of kinematics (i.e., the motion of objects). You might already know that distance = rate x time. This tutorial essentially reviews that idea with a vector lens (we introduce you to vectors here as well). So strap your belts (actually this might not be necessary since we don't plan on decelerating in this tutorial) and prepare for a gentle ride of foundational physics knowledge.

Introduction to physics
What is physics?
Introduction to vectors and scalars
What is displacement?
Calculating average velocity or speed
Solving for time
Displacement from time and velocity example
Instantaneous speed and velocity
What is velocity?
Position vs. time graphs
What are position vs. time graphs?

Introduction to vectors and scalars

https://www.khanacademy.org/science/physics/one-dimensional-motion/displacement-velocity-time/v/introduction-to-vectors-and-scalars

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ONE-DIMENSIONAL MOTION Displacement, velocity, and time

Introduction to physics
What is physics?
Introduction to vectors and scalars
What is displacement?
Calculating average velocity or speed
Solving for time
Displacement from time and velocity example
Instantaneous speed and velocity
What is velocity?
Position vs. time graphs
What are position vs. time graphs?

Introduction to vectors and scalars

Total energy points 0

Vectors magnitude / size AND Direction Displacement 5 meters Vector change in time

scalars magnitude / size scalar 5 meters distance

Distance, displacement, speed and velocity. Difference between vectors and scalars Options Share Info

Ask a question... Questions Tips & Thanks Guidelines Report a mistake Top Recent

NEXT SECTION:

(2) What is displacement? | x

https://www.khanacademy.org/science/physics/one-dimensional-motion/displacement-velocity-time/a/what-is-displacement

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ONE-DIMENSIONAL MOTION

Displacement, velocity, and time

- Introduction to physics
- What is physics?
- Introduction to vectors and scalars
- What is displacement?**
- Calculating average velocity or speed
- Solving for time
- Displacement from time and velocity example
- Instantaneous speed and velocity
- What is velocity?
- Position vs. time graphs
- What are position vs. time graphs?

What is displacement?

What does position mean?

In physics, we love precisely describing the motion of an object. Seriously, the first few chapters of basically every physics textbook are devoted to teaching people how to precisely describe motion since it is so important to everything else we do in physics.

But to describe an object's motion we have to first be able to describe its position—where it is at any particular time. More precisely, we need to specify its position relative to a convenient reference frame. Earth is often used as a reference frame, and we often describe the position of an object as it relates to stationary objects in that reference frame. For example, a professor's position could be described in terms of where she is in relation to the nearby white board (see figure 1 below). In other cases, we use reference frames that are not stationary but are in motion relative to the Earth. To describe the position of a person in an airplane, for example, we use the airplane, not the Earth, as the reference frame (see figure 2 below)

The variable x is often used to represent the horizontal position. The variable y is often used to represent the vertical position. [\[What about \$z\$?\]](#)

What does displacement mean?

If an object moves relative to a reference frame (for example, if a professor moves to the right relative to a white board or a passenger moves toward the rear of an airplane), then the object's position changes. This change in position is known as displacement. The word "displacement" implies that an object has moved, or has been displaced.

Displacement is defined to be the change in position of an object. It can be defined mathematically with the following equation.

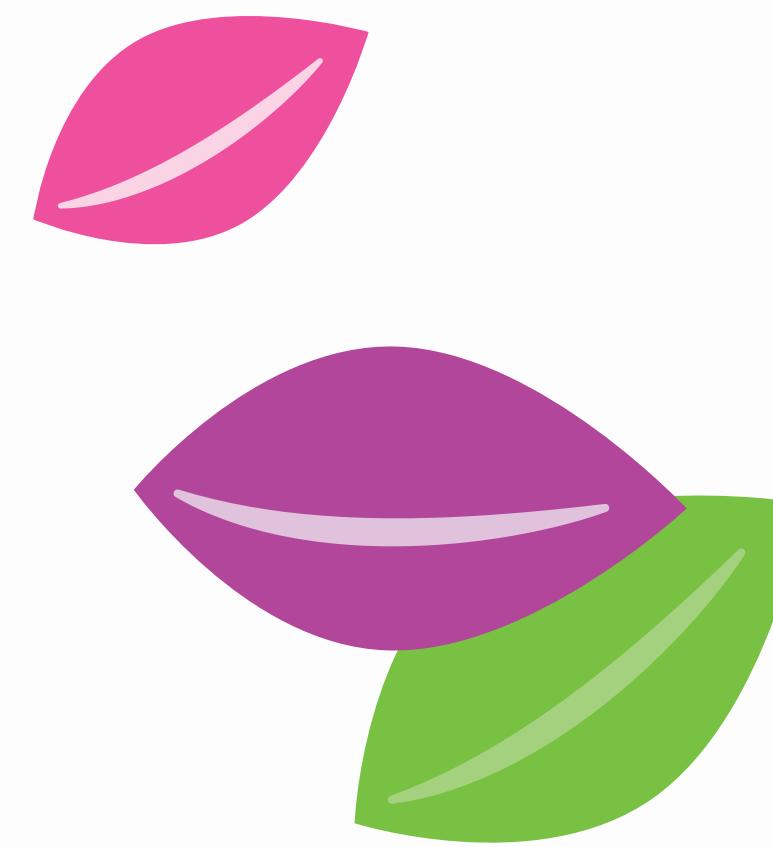
$$\text{Displacement} = \Delta x = x_f - x_0$$

x_f refers to the value of the final position
 x_0 refers to the value of the initial position
 Δx is the symbol used to represent displacement
[\[What does the triangle symbol mean?\]](#)

Displacement is a vector. This means it has a direction as well as a magnitude and is represented visually as an arrow that points from the initial position to the final position. For example consider the professor that walks with relative to the whiteboard in the figure below.



NEXT SECTION:



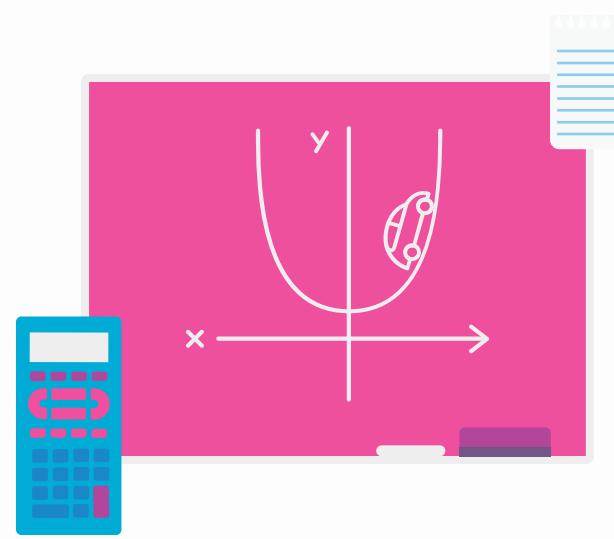
Leaf pages



Videos



Articles



Exercises

Videos

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Video description	Quality/helpful indicator
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Full breadcrumb	Related playlist
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Articles

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Pre-requisites?

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Tips & thanks

Report a mistake





Explore



Explore

Generate as many ideas as possible using the tool you're most comfortable with



Videos

Vectors

magnitude / size

AND

direction

Displacement

s to the right

5 meters

change in time = 2 seconds

scalars

magnitude / size

scalar

↓

5 meters

t distance

Introduction to vectors and scalars

Fast?

$$\frac{5 \text{ meters}}{2 \text{ seconds}} = 2.5 \frac{\text{meters}}{\text{second}}$$
[ABOUT](#)[TRANSCRIPT](#)[COMMENTS](#)

Distance, displacement, speed and velocity. Difference between vectors and scalars

Found in

Physics/One-Dimensional Motion

Prerequisites

Calculus

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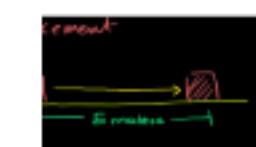
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Physics / One-Dimensional Motion
Displacement, velocity and time

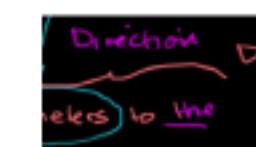
UP NEXT



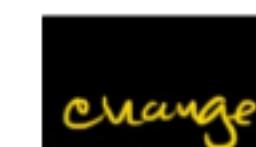
What is displacement?



Calculating average velocity or speed



Solving for time



Displacement from time and velocity example



Instantaneous speed and velocity



Position vs. time graphs



scalar
↓
5 meters
t displacement

meters →

time = 2 seconds

YouTube

Displacement

scalar
↓
5 meters
t displacement

5 meters →

change in time = 2 seconds

YouTube

Displacement

scalar
↓
5 meters
t displacement

5 meters →

change in time =

Introduction to vectors and scalars

Distance, speed and velocity. Difference between

Physics/One-Dimensional Motion

Calculus

Khan

ember 2, 2014

Introduction to vectors and scalars

Distance, displacement, speed and velocity. Difference between vectors and scalars

Found in Physics/One-Dimensional Motion

Prerequisites Calculus

Created by Sal Khan

Published on December 2, 2014

Introduction to vectors and scalars

Distance, displacement, speed and velocity. Difference between vectors and scalars

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Vectors

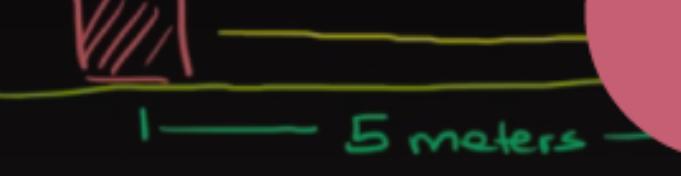
magnitude / size

AND

direction

s to the right

Displacement



scalar

↓

5 meters

distance

Introduction to vectors and scalars

Fast?

TRANSCRIPT

2 seconds

$\frac{5 \text{ meters}}{\text{seconds}} = 2.5 \frac{\text{meters}}{\text{second}}$

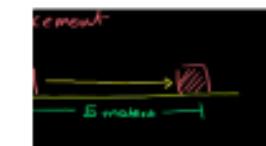
◀ Physics / One-Dimensional Motion

Displacement, velocity and time

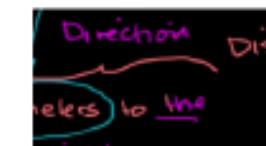
UP NEXT



What is displacement?



Calculating average velocity or speed



Solving for time



Displacement from time and velocity example

QUESTIONS



Ask a question...

TIPS & THANKS

it's same as the speed or is it completely different?

WAH. COMMENTS SECTION IS SO SCURRY :'(

Vectors
◀ One-Dimensional Motion

magnitude / size

AND

direction

Displacement

5 meters →

Fast?

scalars

magnitude / size

scalar

↓

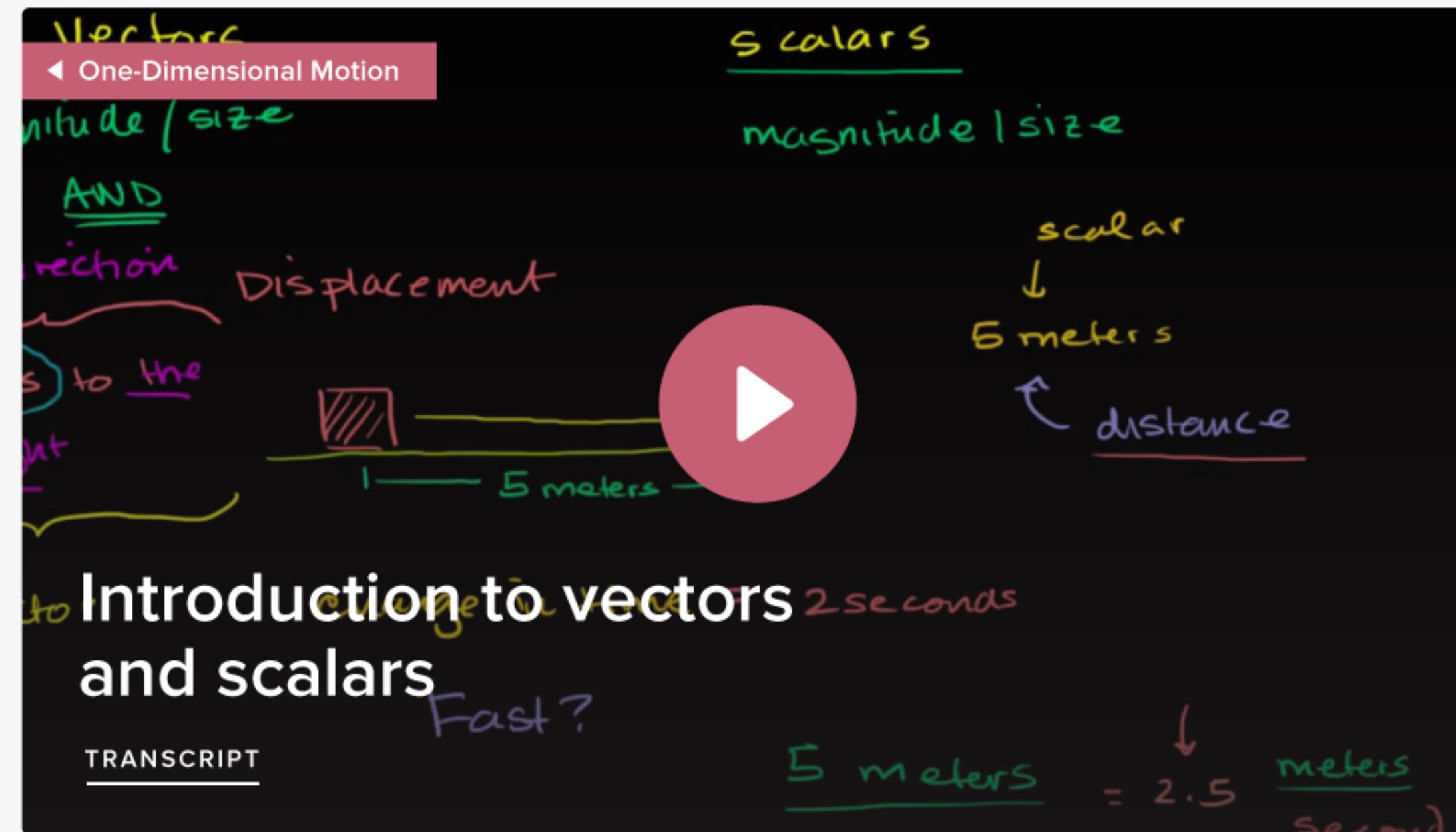
5 meters

↑ distance

5 meters = $\frac{5 \text{ meters}}{2 \text{ seconds}}$

Introduction to vectors and scalars

TRANSCRIPT

**About**

Distance, displacement, speed and velocity. Difference between vectors and scalars

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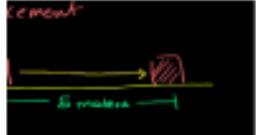
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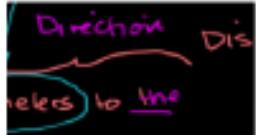
Tags

physics, scalars, vectors

UP NEXT

 What is displacement?

 Calculating average velocity or speed

 Solving for time

 Displacement from time and velocity example

 Instantaneous speed and velocity

QUESTIONS**TIPS & THANKS**

Ask a question...



325 Is velocity same as the speed or is it completely different?

WAH. COMMENTS SECTION IS SO SCURRY :'

The video player displays a handwritten physics lesson. At the top left, it says "Vectors" and "One-Dimensional Motion". Below that, "magnitude / size" is written in green. A large red play button is centered over the video area. To the right, "scalars" is written above "magnitude / size". A diagram shows a shaded rectangle representing displacement, with a horizontal arrow below it labeled "5 meters". To the right, "scalar" is written above "5 meters", with an arrow pointing down to it. Below this, "distance" is written with an arrow pointing to the right. At the bottom left, "change in time = 2 seconds" is written. In the center, "Introduction to vectors and scalars" is written in large white text, with "Fast?" written in purple to its right. At the bottom right, a calculation is shown: $\frac{5 \text{ meters}}{2 \text{ seconds}} = 2.5 \frac{\text{meters}}{\text{second}}$.

Introduction to vectors and scalars

Distance, displacement, speed and velocity. Difference between vectors and scalars

FOUND IN

Physics/One-Dimensional Motion

PREREQUISITES

Calculus

CREATED BY

Sal Khan

TAGS

physics, scalars, vectors

[VIEW TRANSCRIPT](#)

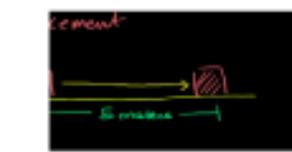
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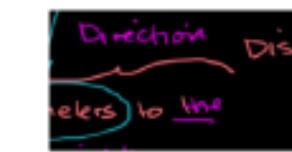
UP NEXT



What is displacement?



Calculating average velocity or speed



Solving for time



Displacement from time and velocity example



Instantaneous speed and velocity

QUESTIONS

TIPS & THANKS



Ask a question...



325 Is velocity same as the speed or is it completely different?

WAH. COMMENTS SECTION IS SO SCURRY :'(

Vectors
magnitude / size
AND
direction
Displacement
5 meters to the right
Vector

scalars
magnitude / size
scalar
5 meters
distance

change in time = 2 seconds
Fast?
$$\frac{5 \text{ meters}}{2 \text{ seconds}} = 2.5 \frac{\text{meters}}{\text{second}}$$

Introduction to vectors and scalars

Distance, displacement, speed and velocity. Difference between vectors and scalars

FOUND IN
Physics/One-Dimensional Motion

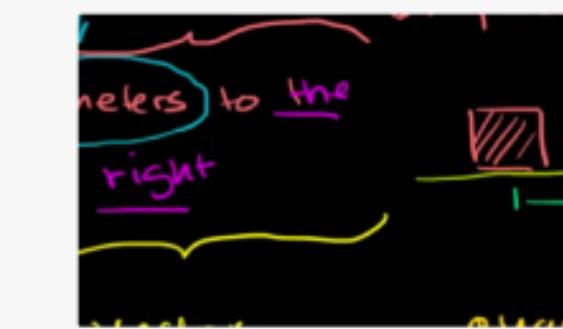
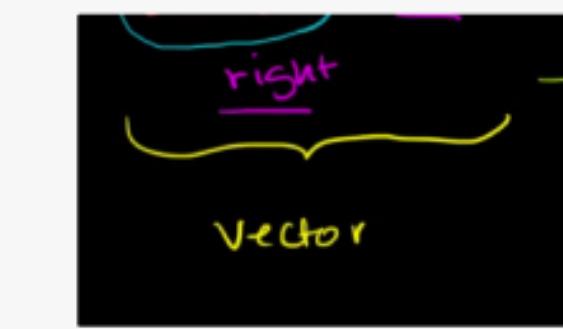
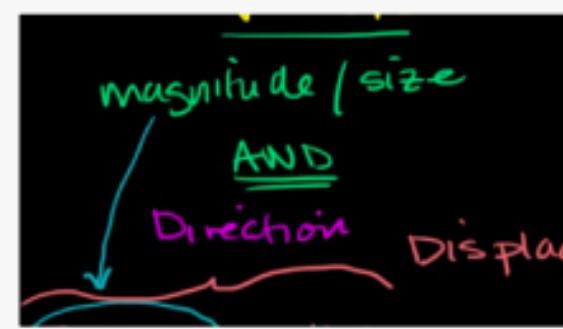
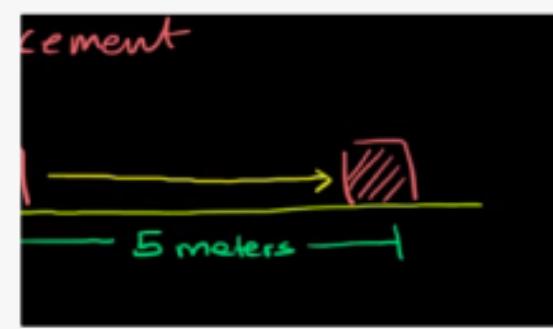
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PLAYLIST RELATED



QUESTIONS

TIPS & THANKS



Ask a question...

▲

325 Is velocity same as the speed or is it completely different?

ONE-DIMENSIONAL MOTION

Introduction to vectors and scalars

Distance, displacement, speed and velocity.
Difference between vectors and scalars.

FOUND IN
Physics/One-Dimensional Motion

PREREQUISITES
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physics, scalars, vectors

Vectors

magnitude / size

AND

direction

s to the

ut

or

Displacement



Scalars

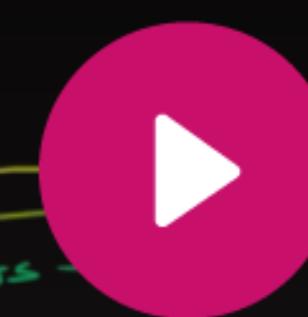
magnitude / size

scalar

↓

5 meters

distance



change in time = 2 seconds

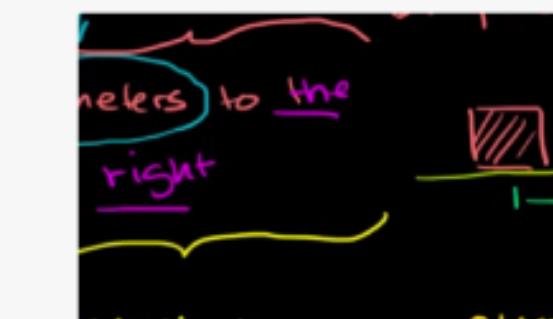
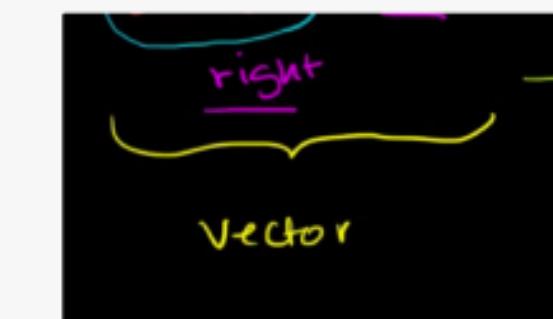
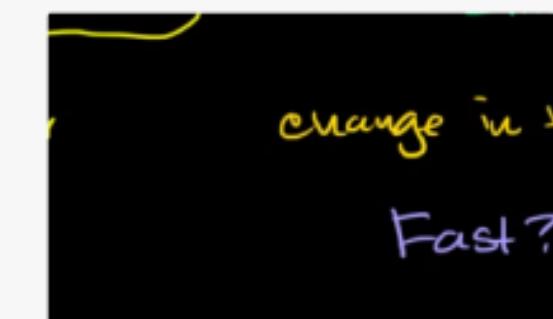
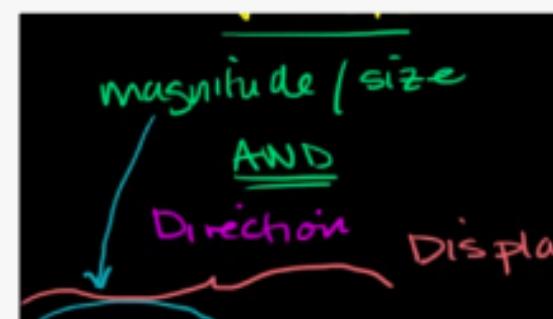
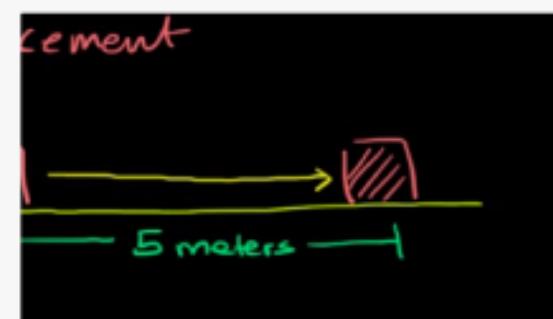
Fast?

$$\frac{5 \text{ meters}}{2 \text{ seconds}} = 2.5 \frac{\text{meters}}{\text{second}}$$

PLAYLIST

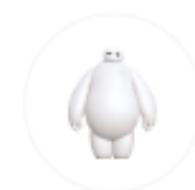
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PREREQUISITES



QUESTIONS

TIPS & THANKS



Ask a question...

ONE-DIMENSIONAL MOTION

Introduction to vectors and scalars

Distance, displacement, speed and velocity.
Difference between vectors and scalars.

FOUND IN
Physics/One-Dimensional Motion

PREREQUISITES
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TAGS
physics, scalars, vectors

Vectors

magnitude / size

AND

direction

s to the

ut

or

Displacement



change in time = 2 seconds

Fast?

$$\frac{5 \text{ meters}}{2 \text{ seconds}} = 2.5 \frac{\text{meters}}{\text{second}}$$

Scalars

magnitude / size

scalar

↓

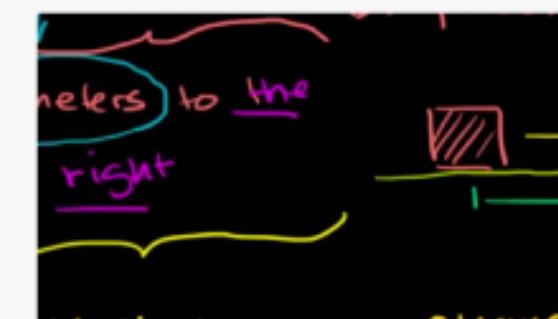
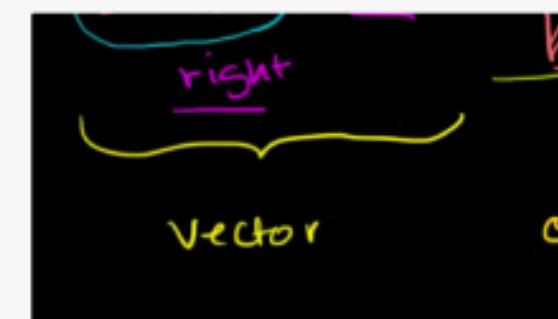
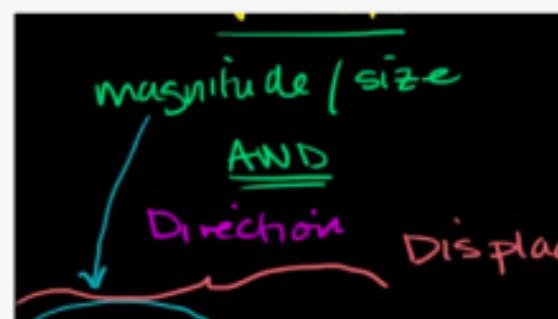
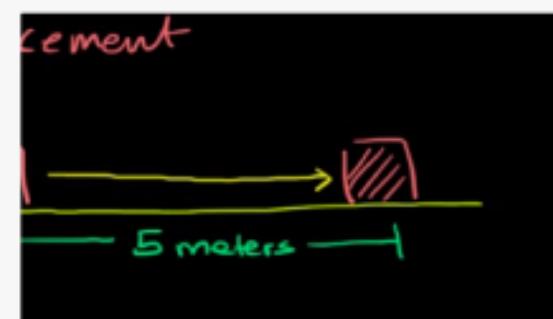
5 meters

distance

PLAYLIST

RELATED

PREREQUISITES



QUESTIONS

TIPS & THANKS



Ask a question...

ONE-DIMENSIONAL MOTION

Introduction to vectors and scalars

Distance, displacement, speed and velocity.
Difference between vectors and scalars.

FOUND IN
Physics/One-Dimensional Motion

PREREQUISITES
Calculus

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Sal Khan

TAGS
physics, scalars, vectors, distance, displacement >

Vectors
magnitude / size
AND
direction
(s) to the
mt
vector

displacement

scalar
↓
5 meters

distance

change in time = 2 seconds

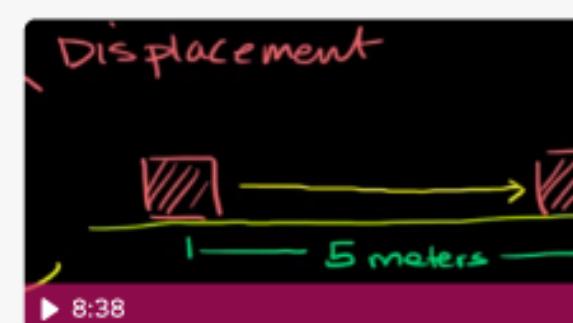
Fast?

5 meters ↓ = 2.5 meters
 seconds)

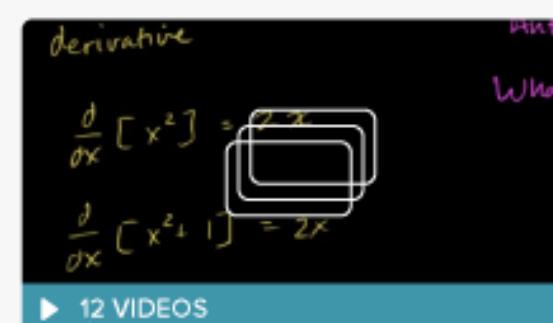
PLAYLIST

RELATED

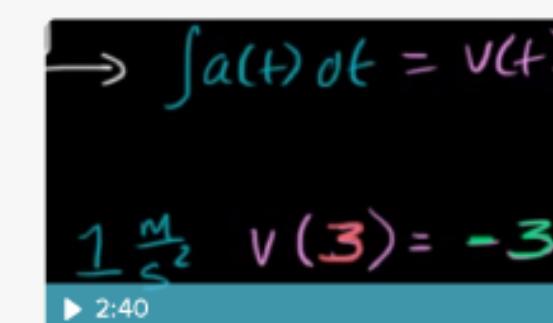
PREREQUISITES



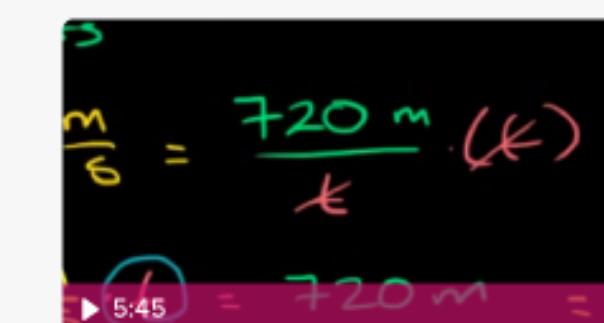
What is displacement?
Physics | One-dimensional motion



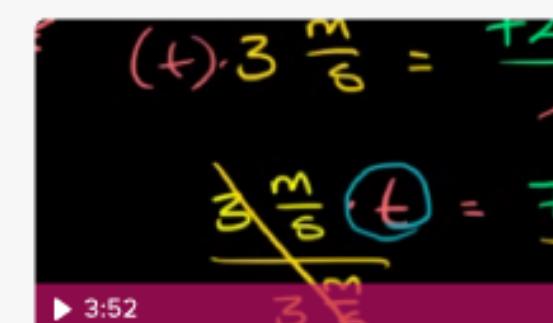
Playlist: Integrals
Math | Integral Calculus



Velocity and position from
acceleration
Math | Integral Calculus



Solving for time
Physics | One-dimensional motion



Displacement from time and
velocity example
Physics | One-dimensional motion

QUESTIONS

TIPS & THANKS



Ask a question...

Calculating average velocity or speed

Created by [Sal Khan](#). Example of calculating [speed](#) and [velocity](#).

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11:45

520

Displacement

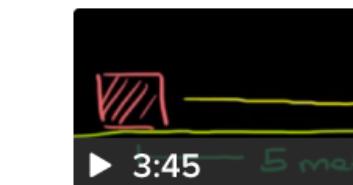
scale ↓
5 meter

change in time = 2 seconds

Fast?

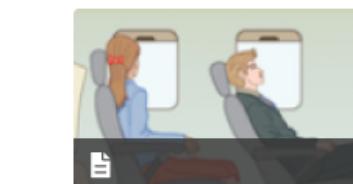
A handwritten diagram on a black background. It shows two vertical rectangles representing objects at different positions along a horizontal line. An arrow points from the first object to the second, labeled "5 meters". To the right, there is handwritten text: "scale ↓" above "5 meter", and below it "change in time = 2 seconds". At the bottom, the word "Fast?" is written in blue. A large red circular play button is overlaid on the center of the diagram.

Playlist: Displacement, Velocity, Time



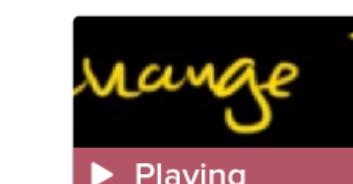
1. Introduction to vectors and scalars

By [Sal Khan](#)



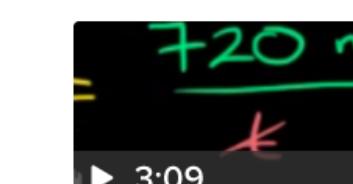
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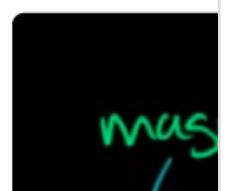
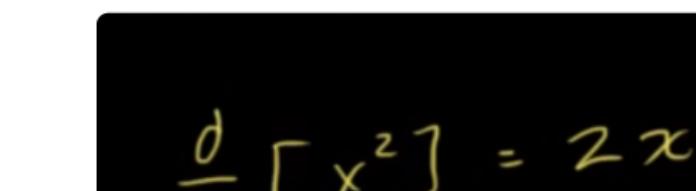
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Recommended



ONE-DIMENSIONAL MOTION

Introduction to vectors and scalars

Distance, displacement, speed and velocity.
Difference between vectors and scalars.

FOUND IN
Physics/One-Dimensional Motion

PREREQUISITES
Calculus

CREATED BY
Sal Khan

TAGS
physics, scalars, vectors, distance, displacement >

Vectors

magnitude / size

AND

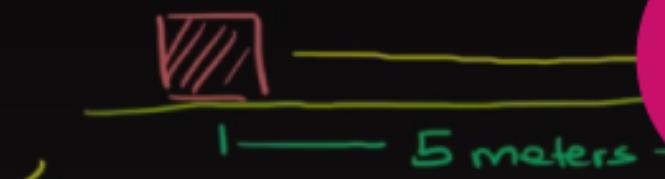
direction

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tor

Displacement



1 — 5 meters —

scalars

magnitude / size

scalar

↓

5 meters

distance



change in time = 2 seconds

Fast?

$$\frac{5 \text{ meters}}{2 \text{ seconds}} = 2.5 \frac{\text{meters}}{\text{second}}$$

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What is displacement?

Physics | One-dimensional motion

QUESTIONS



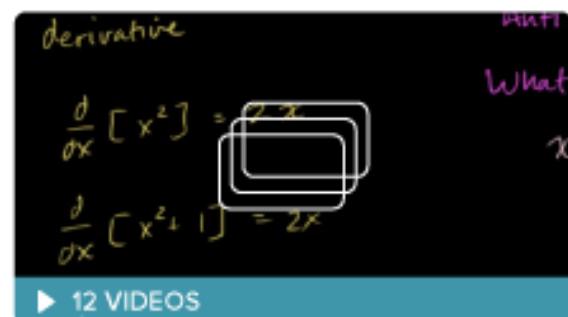
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325

Is velocity same as the speed or is it completely different?

TIPS & THANKS



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Math | Integral Calculus

$$\int a(t) dt = v(t)$$

DUTCH REPUBLIC

Rembrandt, Christ Crucified between the Two Thieves: The Three Crosses

Met curator Nadine Orenstein on universal emotion in Rembrandt van Rijn's Christ Crucified between the Two Thieves: The Three Crosses, 1653. [More Info.](#)

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QUESTIONS**TIPS & THANKS**

ART HISTORY / EXPRESSIONISM TO POP ART / POP

Why is this art? Andy Warhol, Campbell's Soup Cans

Steven Zucker and Sal Khan discuss Andy Warhol's Campbell's Soup Cans

WRITTEN BY

Mya Dosch

PREREQUISITES

Abstract Expressionism

TAGS

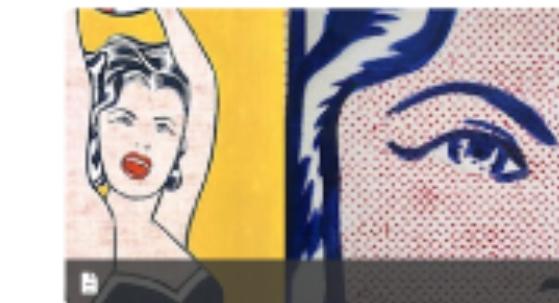
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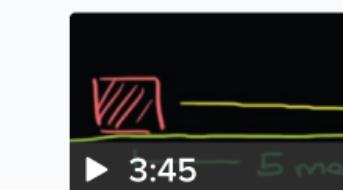
Displacement

scalar
↓
5 meter

change in time = 2 seconds

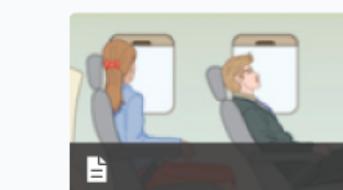
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Playlist: Displacement, Velocity, Time



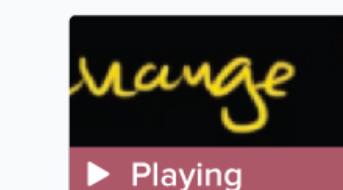
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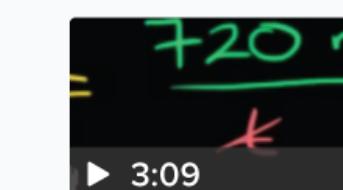
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Calculating average velocity or speed

Example of calculating speed and velocity. Created by Sal Khan.

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Velocity

Scalars

Physics

Distance

Displacement

Speed

Vectors

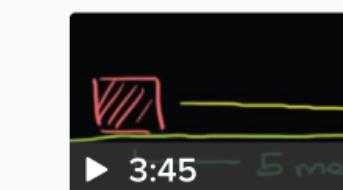
Displacement

scalar ↓ 5 meter t d

change in time = 2 seconds

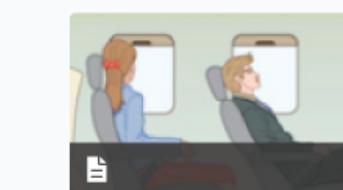
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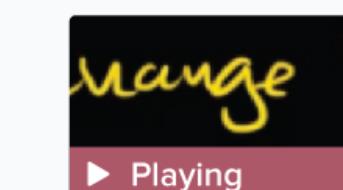
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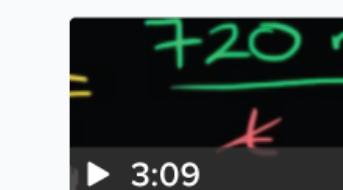
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Calculating average velocity or speed

Example of calculating speed and velocity. Created by Sal Khan.

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Velocity Scalars Physics Distance Displacement Speed Vectors



Articles

IDENTITY, THE BODY AND THE SUBVERSION OF MODERNISM

Nauman, The True Artist Helps the World by Revealing Mystic Truths



Bruce Nauman, *The True Artist Helps the World by Revealing Mystic Truths*, 1967, neon and clear glass tubing, suspension supports, 140.26 x 120.7 x 5.02

Bruce Nauman's neon sign asks a multitude of questions with regard to the ways in which the 20th century conceived both avant-garde art and the role of the artist in society. If earlier European modernists, such as Mondrian, Malevich, and Kandinsky, sought to use art to reveal deep-seated truths about the human condition and the role of the artist in general, then Bruce Nauman's *The True Artist Helps the World by Revealing Mystic Truths* questions such transhistorical and universal

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The most difficult thing about the whole piece for me was the statement. It was a kind of test—like when you say something out loud to see if you believe it. Once written down, I could see that the statement [...] was on the one hand a totally silly idea and yet, on the other hand, I believed it. It's true and not true at the same time. It depends on how you interpret it and how seriously you take yourself. For me it's still a very strong thought.

POP ART

Oldenburg, Lipstick (Ascending) on Caterpillar Tracks



Oldenburg stands next to his sculpture (left); students rally while one woman posts a sign which pictures the female symbol with a fist in the center and reads: Liberté / Egalité / Sororité (right) from Women at Yale

WRITTEN BY

Mya Dosch

PREREQUISITES

Abstract Expressionism

TAGS

Modernism, Contemporary, Oldenburg, Pop, Art History

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Pop Art

Expressionism to Pop Art / Pop Art
By Virginia Spivey

A monumental tube of lipstick sprouting from a military vehicle appeared, uninvited, on the campus of Yale University amidst the 1969 student protests against the Vietnam War. While the sculpture may have seemed like a playful, if elaborate artistic joke, Claes Oldenburg's Lipstick (Ascending) on Caterpillar Tracks was also deeply critical. Oldenburg made the 24-foot-high sculpture in collaboration with architecture students at his alma mater and then surreptitiously delivered it to Yale's Beinecke Plaza. In Beinecke Plaza, the sculpture overlooked both the office of Yale's president and a prominent World War I memorial. Lipstick (Ascending) on Caterpillar Tracks claimed a visible space for the anti-war movement while also poking fun at the solemnity of the plaza. The sculpture served as a stage and backdrop for several subsequent student protests.

Oldenburg and the architecture students never intended for the original Lipstick (Ascending) on Caterpillar Tracks sculpture to be permanent. They

POP ART

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Oldenburg and the architecture students never intended for the original Lipstick (Ascending) on Caterpillar Tracks sculpture to be permanent. They made the base of plywood, and the red vinyl tip of the lipstick could be comically inflated and deflated—although

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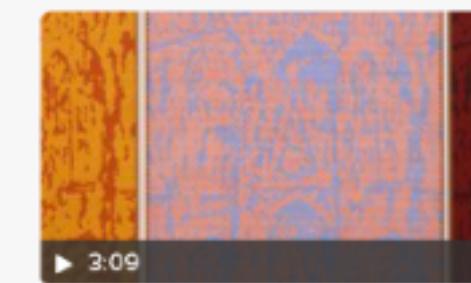
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Oldenburg, Lipstick (Ascending) on Caterpillar Tracks



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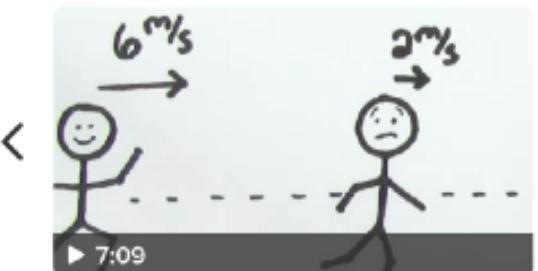


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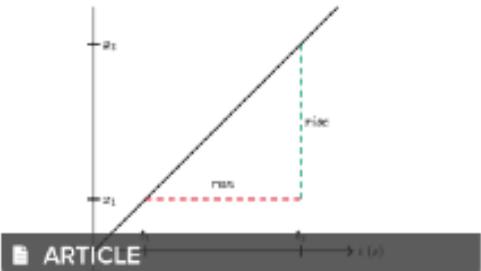
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What does position mean?

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Instantaneous speed and velocity
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What are position vs. time graphs?
Displacement, Velocity, and Time

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Introduction to vectors and scalars
Displacement, Velocity, and Time

reference frame, and we often describe the position of an object as it relates to stationary objects in that reference frame. For example, a professor's position could be described in terms of where she is in relation to the nearby white board (see figure 1 below). In other cases, we use reference frames that are not stationary but are in motion relative to the Earth. To describe the position of a person in an airplane, for example, we use the airplane, not the Earth, as the reference frame (see figure 2 below)

The variable x is often used to represent the horizontal position. The variable y is often used to represent the vertical position. [What about \$z\$?](#)

What does displacement mean?

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Displacement is a vector.

This means it has a direction as well as a magnitude and is represented visually as an arrow that points from the initial position to the final position. For example consider the professor that walks with relative to the whiteboard in the figure below.

What is displacement?

A brief introduction of displacement. Written by [Sal Khan](#).

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What does position mean?

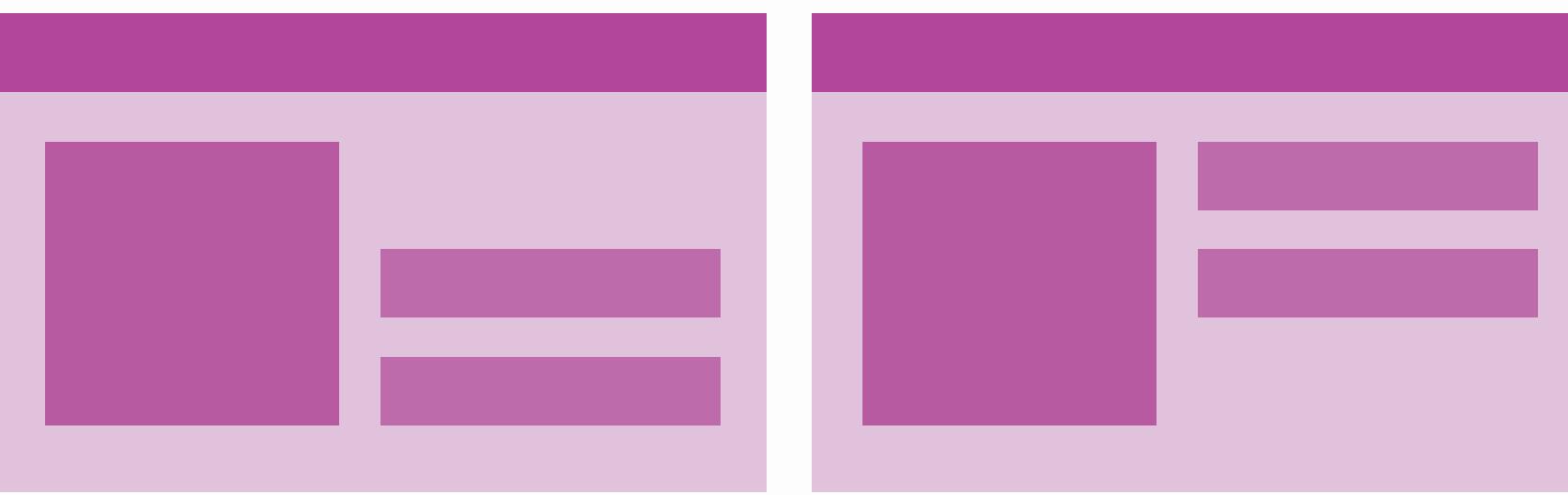
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The variable x is often used to represent the horizontal position. The variable y is often used to represent the vertical position. [What about \$z\$?](#)

What does displacement mean?

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Takeaway #1

Only change one thing at a time!

WRITTEN BY

Mya Dosch

PREREQUISITES

Abstract Expressionism

TAGS

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[Lipstick](#) [Oldenburg](#)

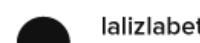

Pop Art
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Why is this art? Andy Warhol, Campbell's Soup Cans

Steven Zucker and Sal Khan discuss Andy Warhol's Campbell's Soup Cans

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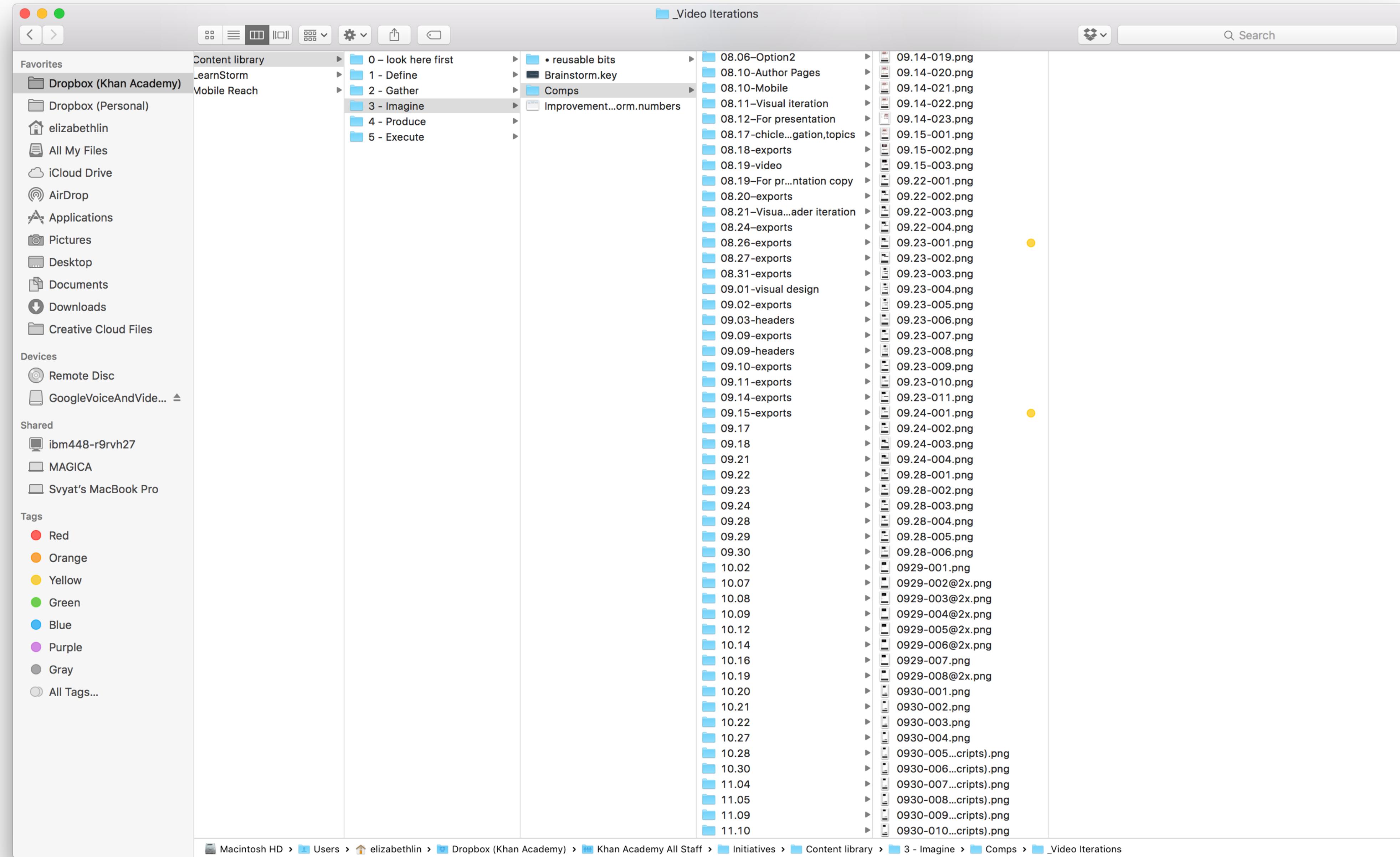
Why is this art? Andy Warhol, Campbell's Soup Cans

Steven Zucker and Sal Khan discuss Andy Warhol's Campbell's Soup Cans



Takeaway #2

Make sure you record each step of the way





Digging In

Introduction to vectors and scalars

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ONE-DIMENSIONAL MOTION Displacement, velocity, and time

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What is velocity?
Position vs. time graphs
What are position vs. time graphs?

Introduction to vectors and scalars

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Vectors magnitude / size AND Direction Displacement 5 meters Vector change in time

scalars magnitude / size scalar 5 meters distance

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ONE-DIMENSIONAL MOTION

Displacement, velocity, and time

- Introduction to physics
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- Displacement from time and velocity example
- Instantaneous speed and velocity
- What is velocity?
- Position vs. time graphs
- What are position vs. time graphs?

What is displacement?

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$$\text{Displacement} = \Delta x = x_f - x_0$$

x_f refers to the value of the final position
 x_0 refers to the value of the initial position
 Δx is the symbol used to represent displacement
[\[What does the triangle symbol mean?\]](#)

Displacement is a vector. This means it has a direction as well as a magnitude and is represented visually as an arrow that points from the initial position to the final position. For example consider the professor that walks with relative to the whiteboard in the figure below.



NEXT SECTION:

Displacement

change in time = 2 seconds

Fast?

3:03

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Calculating average velocity or speedFor AP Physics. Example of calculating [speed](#) and [velocity](#).Created by [Sal Khan](#).[Velocity](#) [Scalars](#) [Physics](#) [Distance](#) [Displacement](#) [Speed](#) [Vectors](#)

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What is displacement?Created by [Sal Khan](#)[Velocity](#) [Scalars](#) [Physics](#) [Distance](#) [Displacement](#) [Speed](#) [Vectors](#)**What does position mean?**

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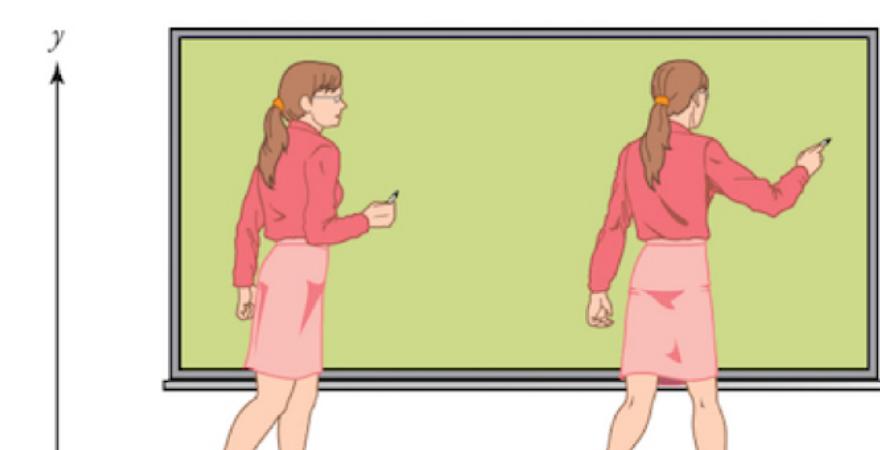
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DISPLACEMENT, VELOCITY, TIME

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Distance, displacement, speed and velocity. Difference between vectors and scalars

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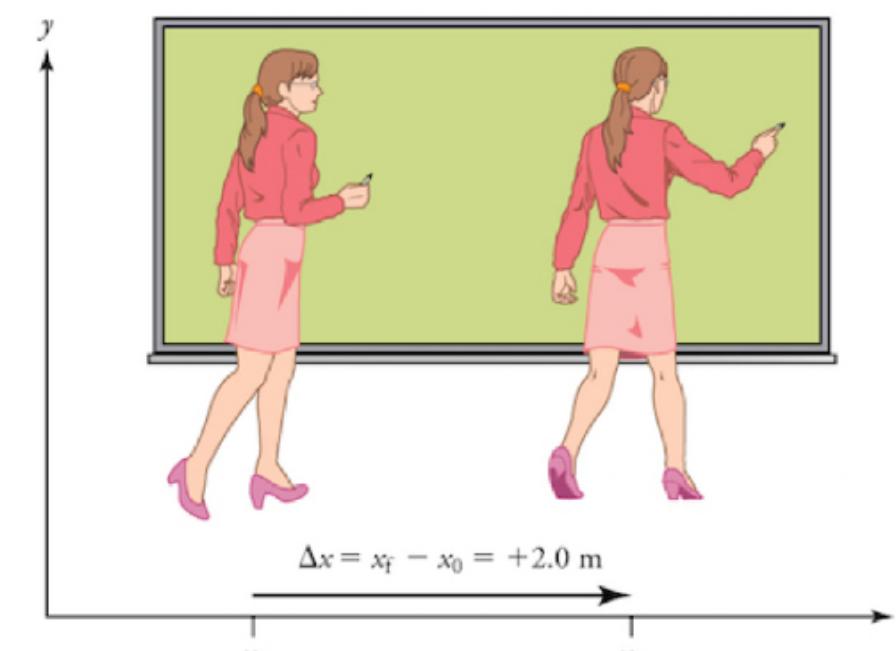
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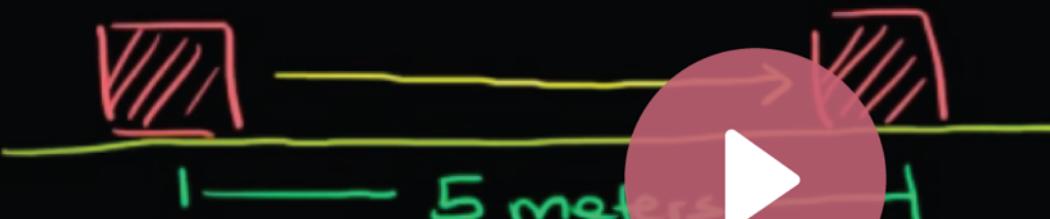
Displacement, velocity, and time

- [Introduction to vectors and scalars](#)
- [Distance, displacement, speed and velocity. Difference between vectors and scalars](#)
- [What is displacement?](#)
- [Calculating average velocity or speed](#)
- [Simple example of solving for time given distance and rate](#)
- [Displacement from time and velocity example](#)
- [Worked example of calculating displacement from time and velocity](#)
- [Instantaneous speed and velocity](#)
- [What is Instantaneous speed?](#)
- [Position vs. time graphs](#)

[Ask a Question](#)

Calculating average velocity or speed

Displacement



change in time = 2 seconds

Fast?

Ask a question...

TOTAL ENERGY POINTS

314,1592

Questions

Lalizlizabeth

Where would it be important to be able to distinguish scalars from vectors?

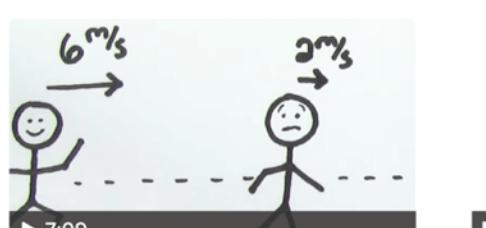
405,230 views

520

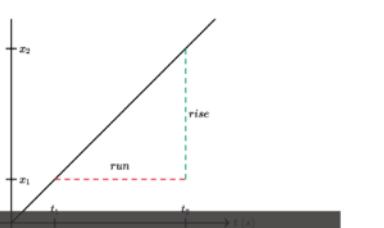
Save for Later

[Show All \(5\)](#)

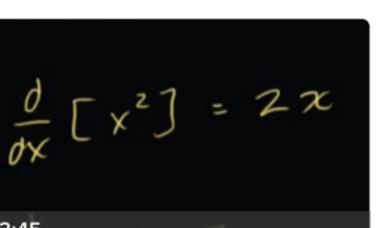
Recommended



Instantaneous speed and velocity
Displacement, Velocity, and Time



What are position vs. time graphs?
Displacement, Velocity, and Time



$\frac{d}{dx} [x^2] = 2x$
Antiderivatives and indefinite integrals
Integrals / Indefinite integral as anti-derivative



Vector representations exercise example
Precalculus / Vectors / Vector Basics



Introduction to vectors and scalars
Displacement, Velocity, and Time

Tradeoff

Clarity vs Flexibility



STUCK







Zooming Out

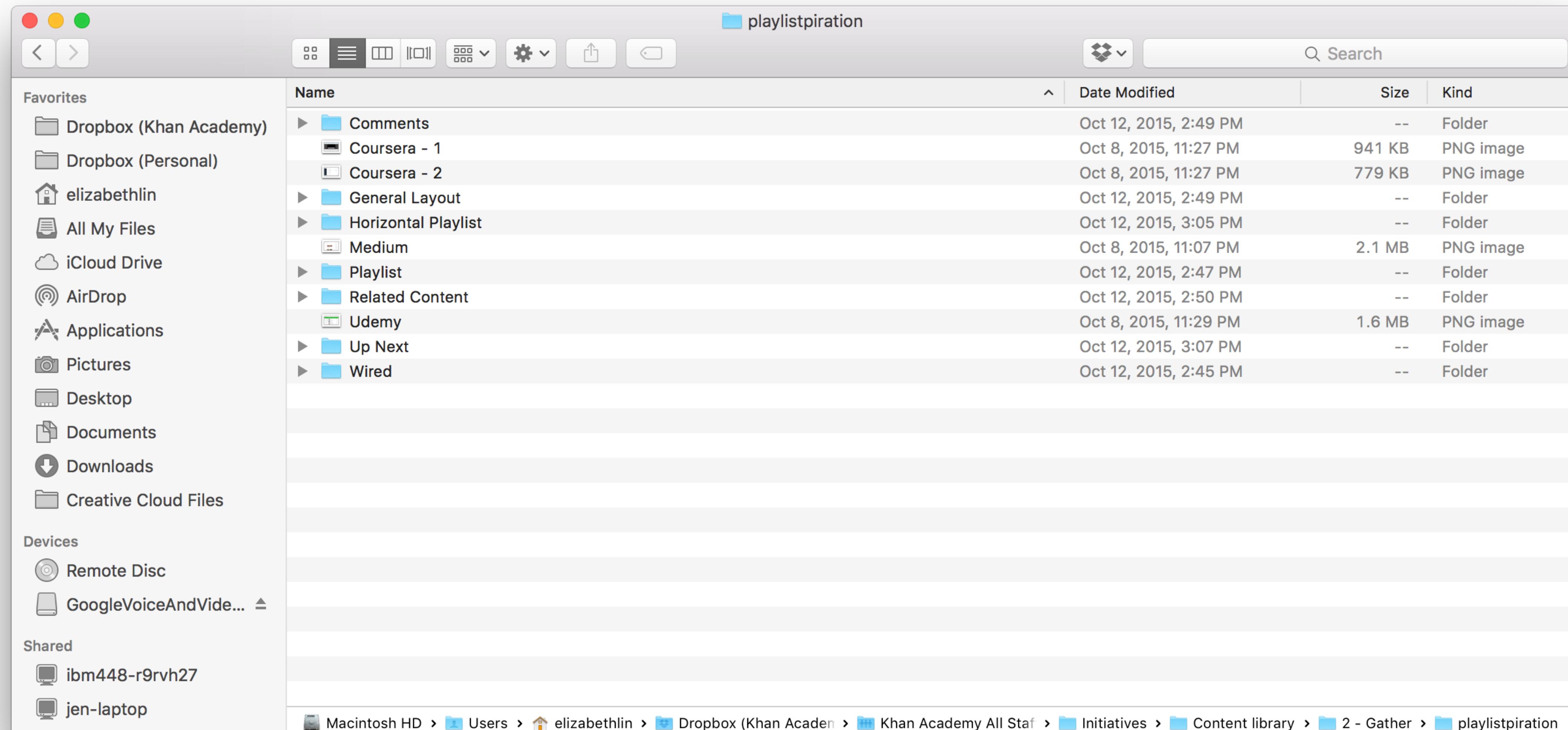
“**SMALL MULTIPLES** reveal, all at once, a scope of alternatives, a range of options.”

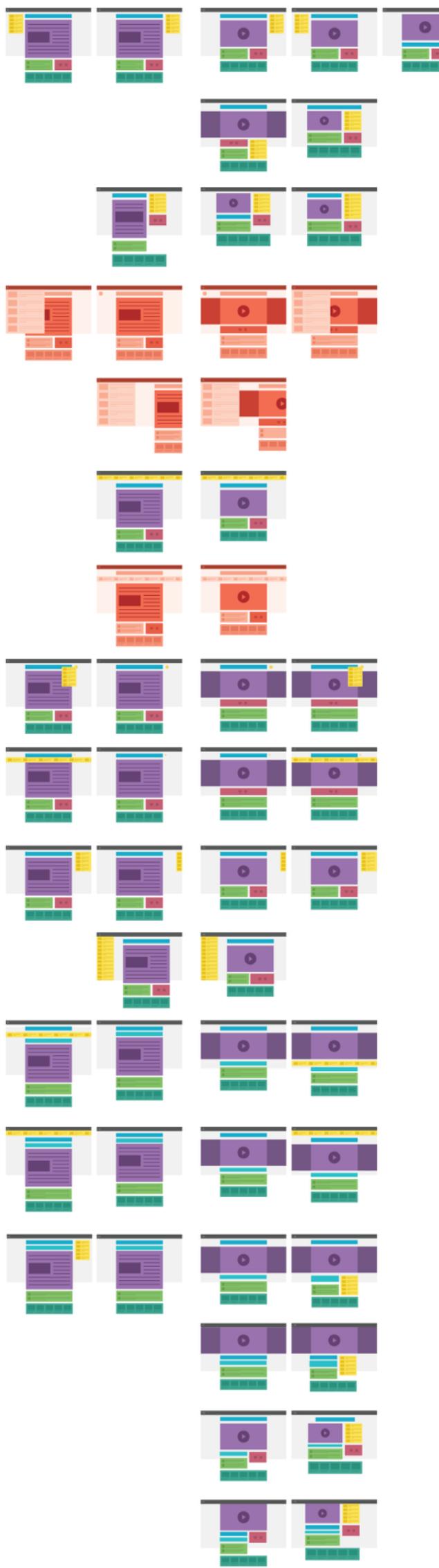
Envisioning Information, Edward Tufte

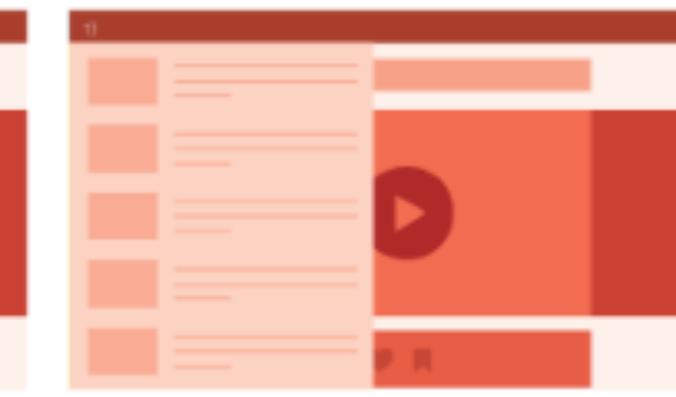
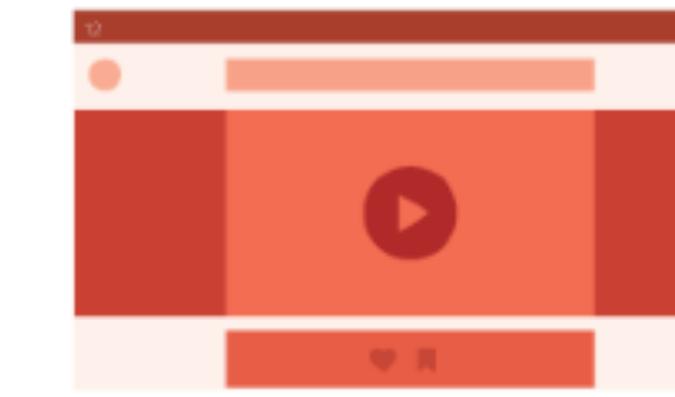
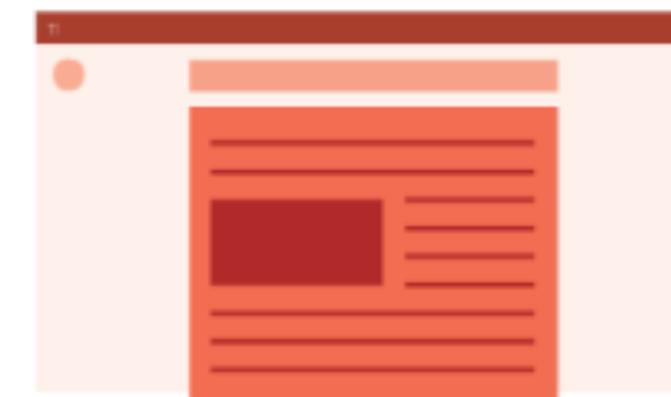
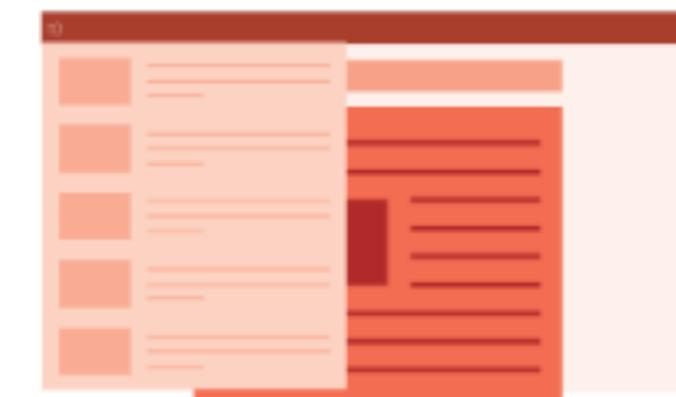
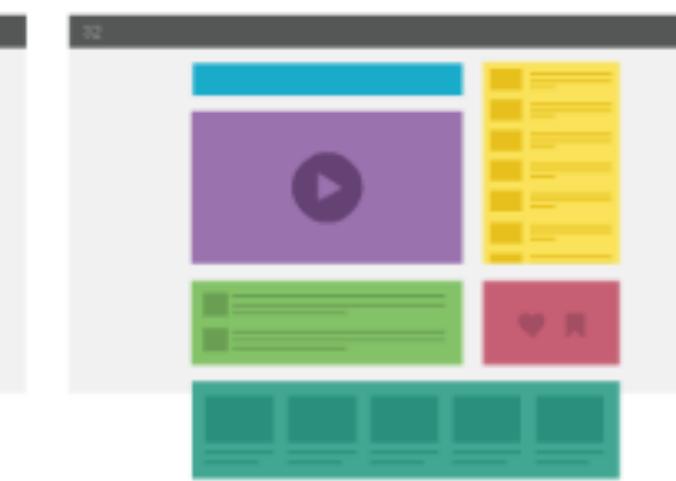
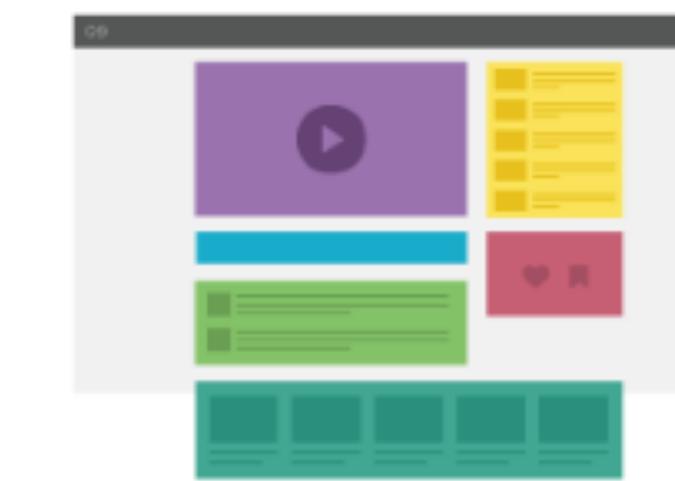
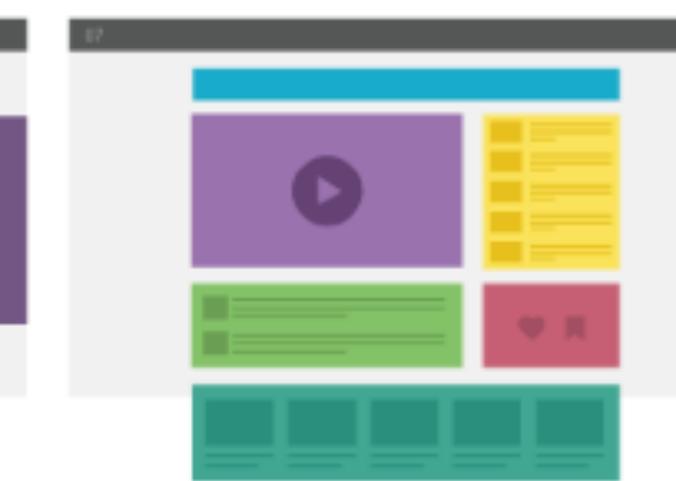
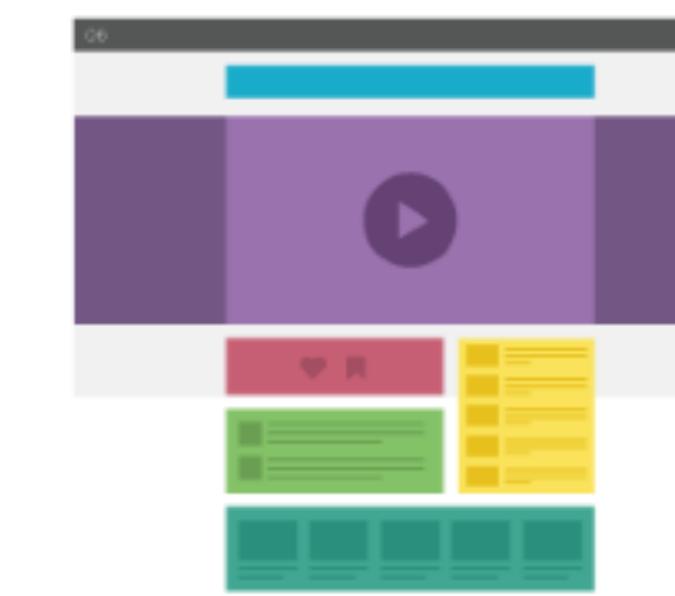
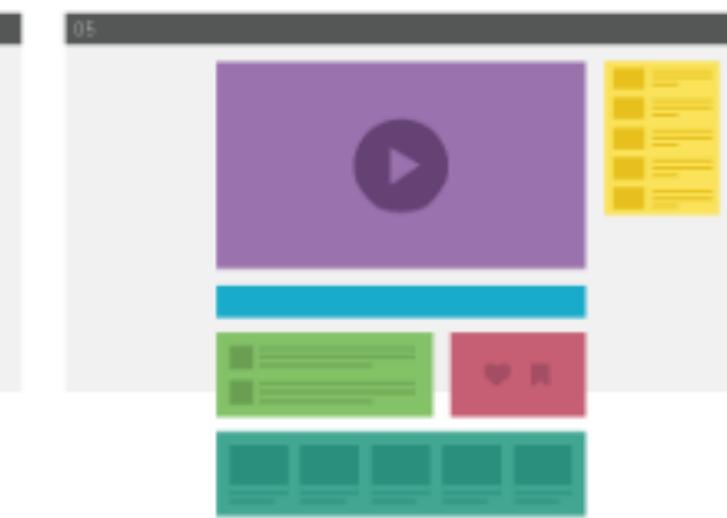
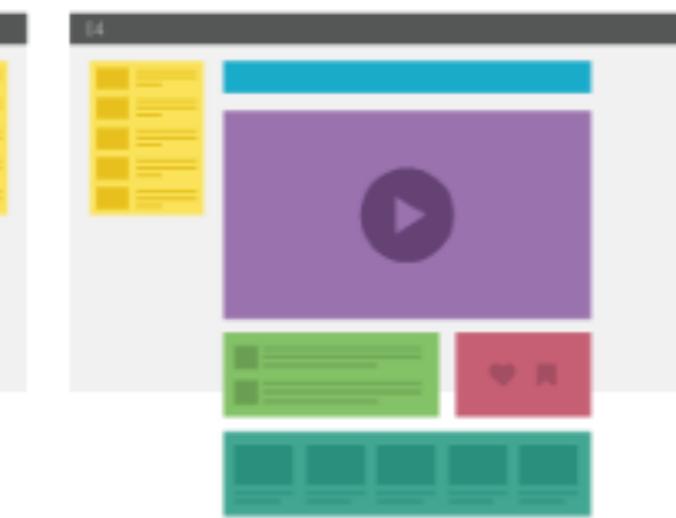
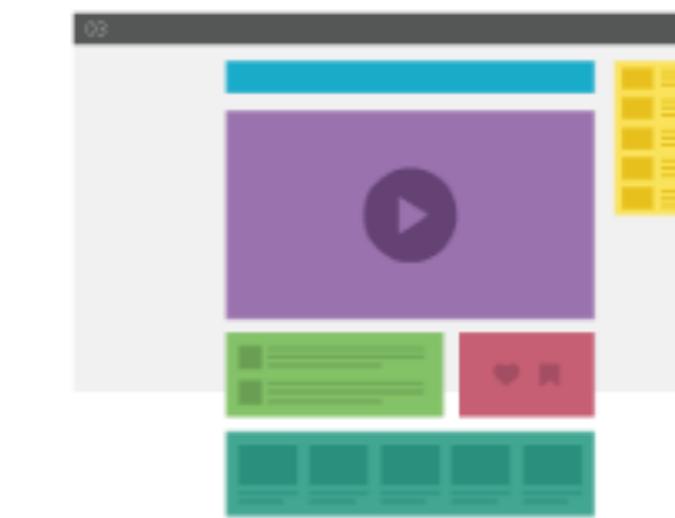
2000: State-level support (orange) or opposition (green) on school vouchers, relative to the national average of 45% support

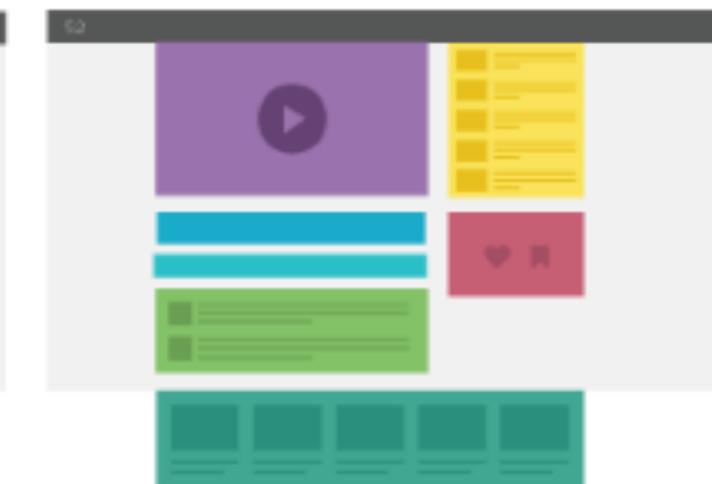
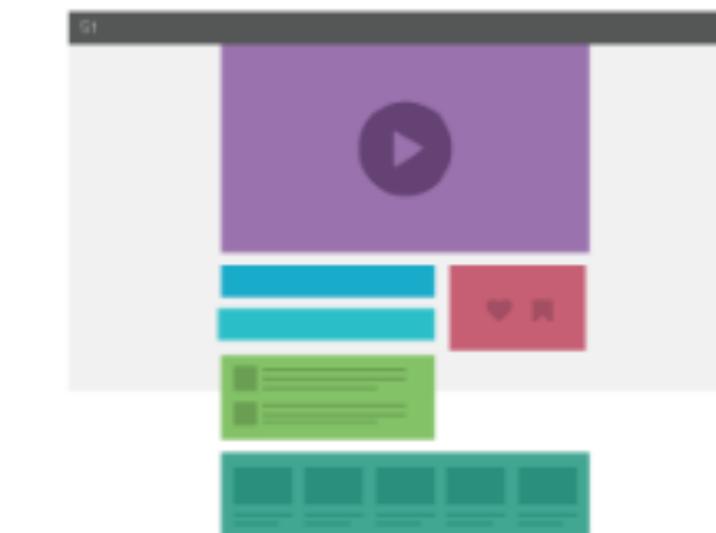
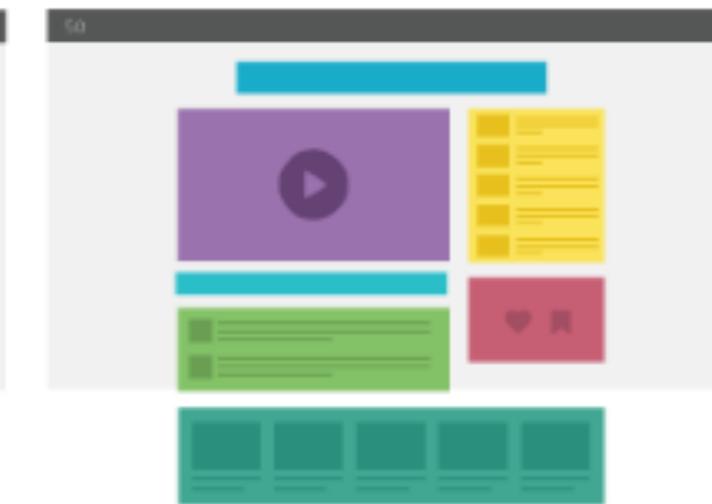
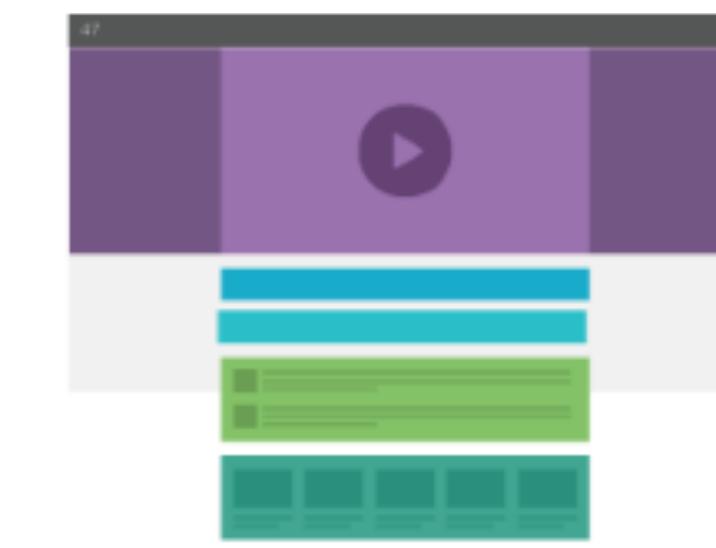
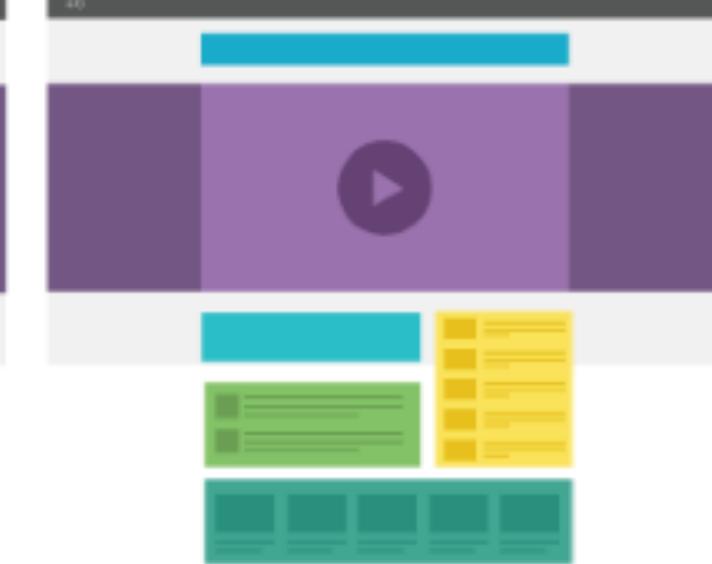
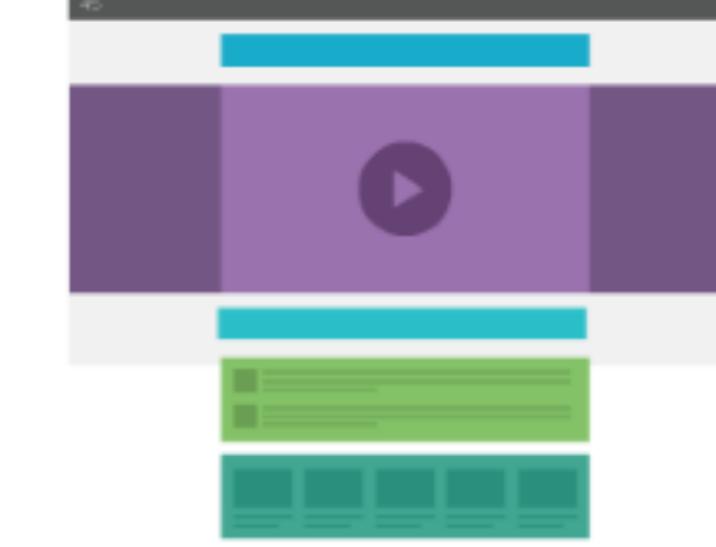


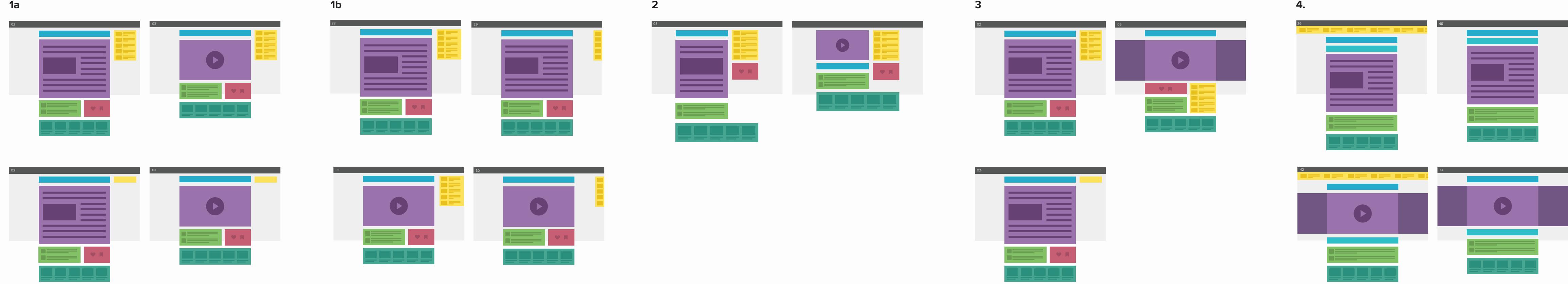
Orange and green colors correspond to states where support for vouchers was greater or less than the national average.
The seven ethnicreligious categories are mutually exclusive. "Evangelicals" includes Mormons as well as born-again Protestants.
Where a category represents less than 1% of the voters of a state, the state is left blank.











*Titles / content are centered,
Playlist lives consistently in right-most column,
Playlist collapses on scroll*

Pros
Flexible articles
Content is front and center
Playlist lives in a consistent place
Playlist can hide

Cons
Layout is heavily weighted to one-side
Playlist is very narrow
Article page off balance

*Titles / content are centered,
Playlist lives consistently on right,
Playlist compresses into thumbnails only*

Pros
Playlist lives in a consistent place
Playlist can compress
Flexible articles

Cons
Playlist is “too” hidden
Playlist is very narrow
Article page off balance

*Titles / content are left-aligned,
Playlist is always visible,
3-column layout*

Pros
Playlist lives in a consistent place

Cons
Playlist lives in different places
Video is not top of page
Playlist on video is pushed to bottom
Inflexible article layout
Wasted last column on long articles

*Titles / content are centered,
Playlist collapses on scroll for articles,
Playlist is fixed for videos*

Pros
Flexible articles
Theater-mode

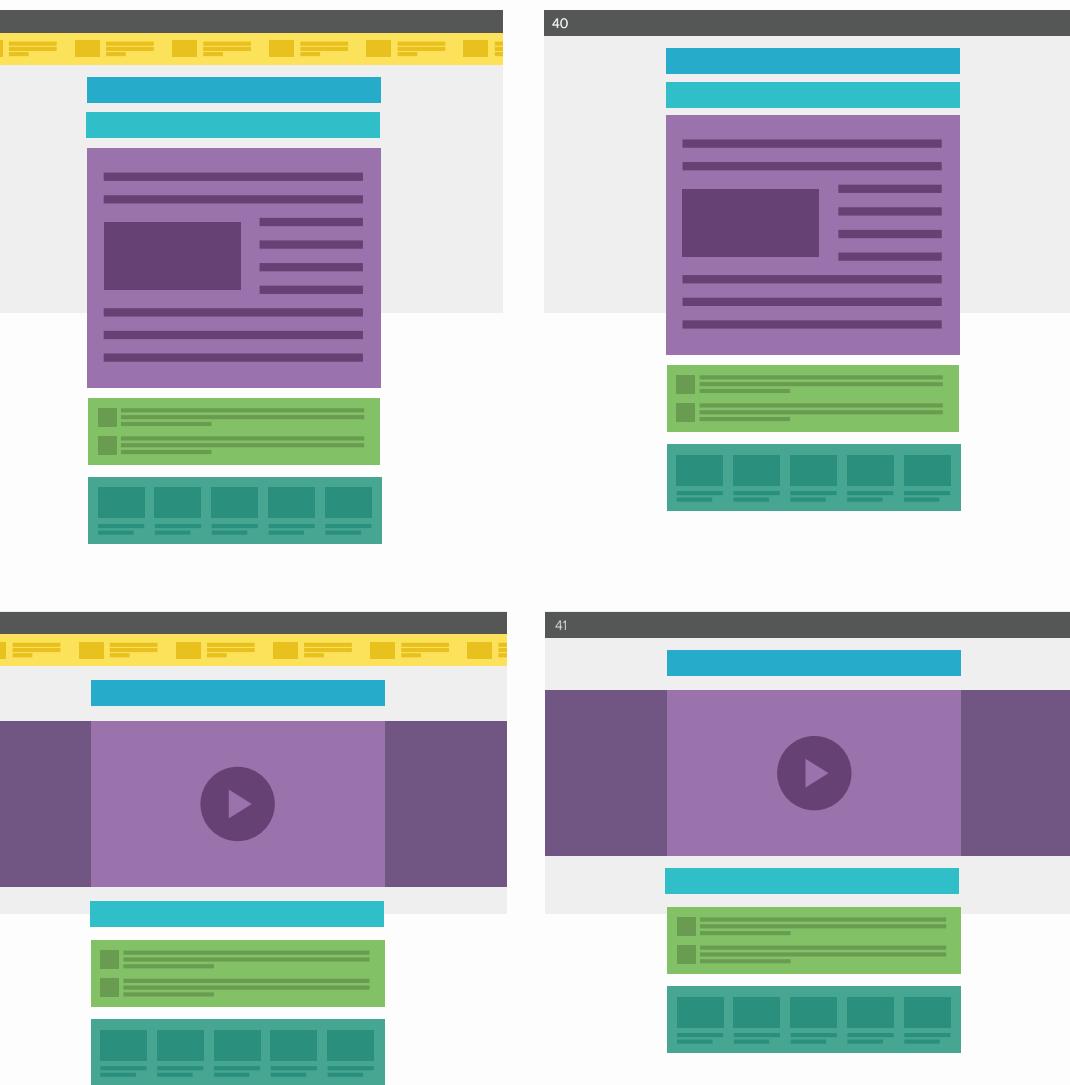
Cons
Playlist lives in different places
Video is not top of page
Playlist on video is pushed to bottom
Article page off balance

*Titles / content are centered,
Playlist lives horizontally on top,
Playlist hides on scroll*

Pros
Playlist lives in a consistent place
Playlist is “out of the way”
Flexible articles

Cons
Video is not top of page
Playlist is constrained by height
Unfamiliar design pattern

4.



*Titles / content are centered,
Playlist lives horizontally on top,
Playlist hides on scroll*

Pros

- Playlist lives in a consistent place
- Playlist is “out of the way”
- Flexible articles

Cons

- Video is not top of page
- Playlist is constrained by height
- Unfamiliar design pattern

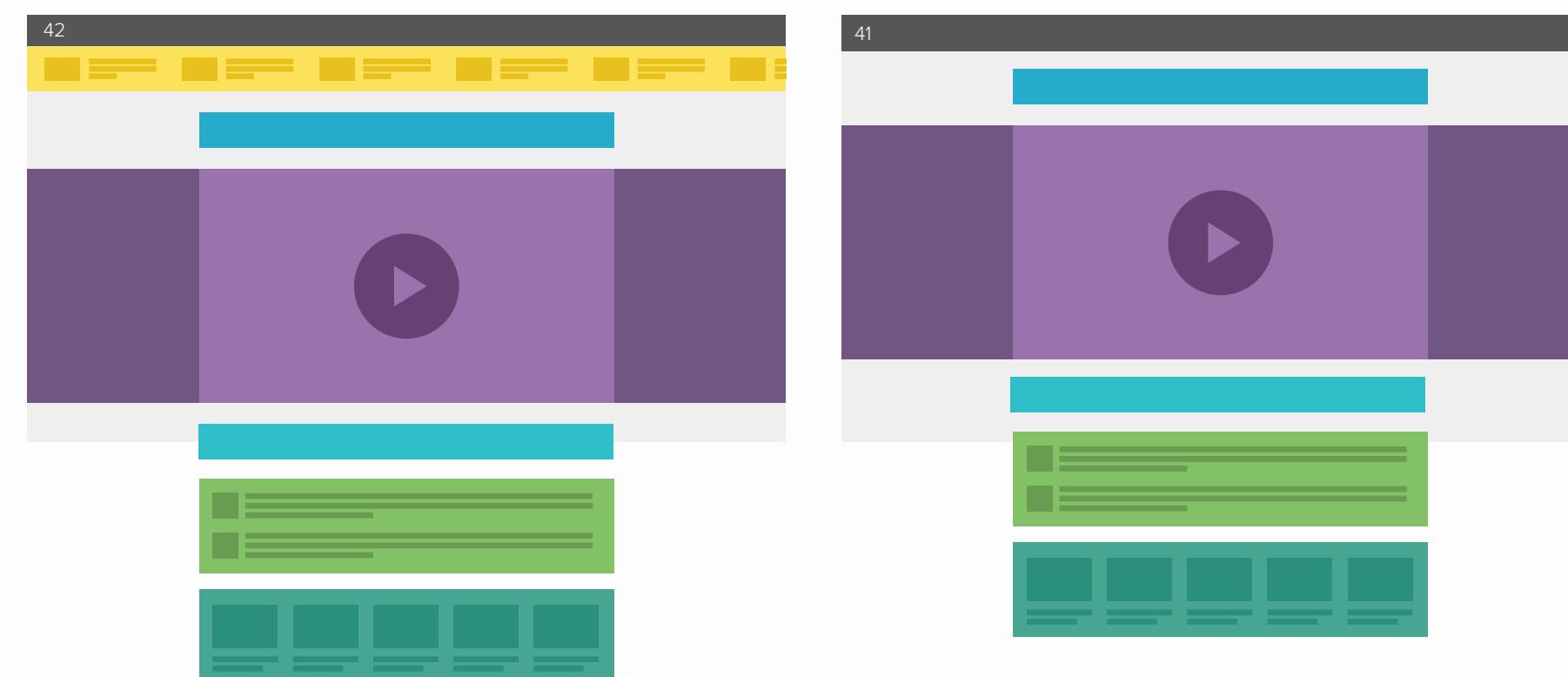
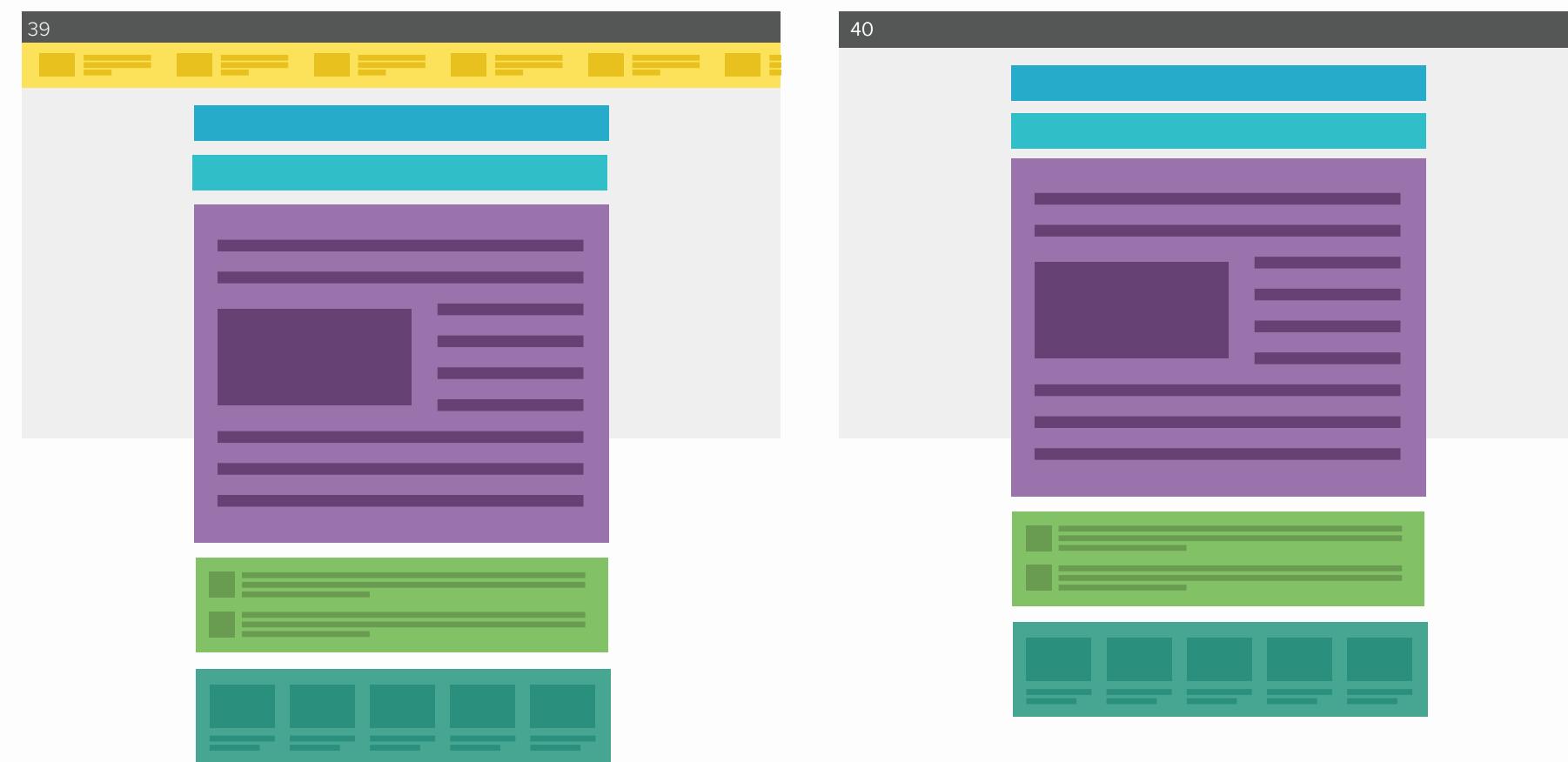


Takeaway #3

If you're stuck, zoom out, and look at the bigger picture!



Zooming back in



1. Introduction to vectors and scalars
Distance, displacement, speed...

2. What is displacement?
In physics, we love precisely describing the motion of an...

3. Calculating average velocity or speed
Distance, displacement, speed...

4. Solving for time
Simple example of solving for time given distance and rate



1. Introduction to vectors and scalars
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PHYSICS | ONE-DIMENSIONAL MOTION | DISPLACEMENT, VELOCITY, AND TIME

What is displacement?

A brief introduction to displacement. Written by Sal Khan.

What does position mean?

In physics, we love precisely describing the motion of an object. Seriously, the first few chapters of basically every physics textbook are devoted to teaching people how to precisely describe motion since it is so important to everything else we do in physics.

But to describe an object's motion we have to first be able to describe its position—where it is at any particular time. More precisely, we need to specify its position relative to a convenient reference frame. Earth is often used as a reference frame, and we often describe the position of an object as it relates to stationary objects in that reference frame. For example, a professor's position could be described in terms of where she is in relation to the nearby white board (see figure 1 below). In other cases, we use reference frames that are not stationary but are in motion relative to the Earth. To describe the position of a person in an airplane, for example, we use the airplane, not the Earth, as the reference frame (see figure 2 below)

The variable x is often used to represent the horizontal position. The variable y is often used to represent the vertical position. [What about \$z\$?](#)

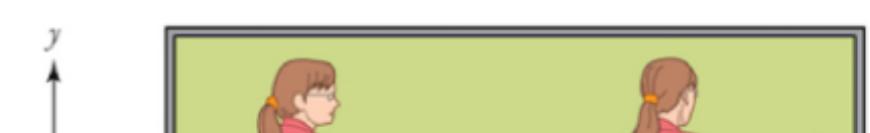
What does displacement mean?

If an object moves relative to a reference frame (for example, if a professor moves to the right relative to a white board or a passenger moves toward the rear of an airplane), then the object's position changes. This change in position is known as displacement. The word "displacement" implies that an object has moved, or has been displaced.

Displacement is defined to be the change in position of an object. It can be defined mathematically with the following equation.

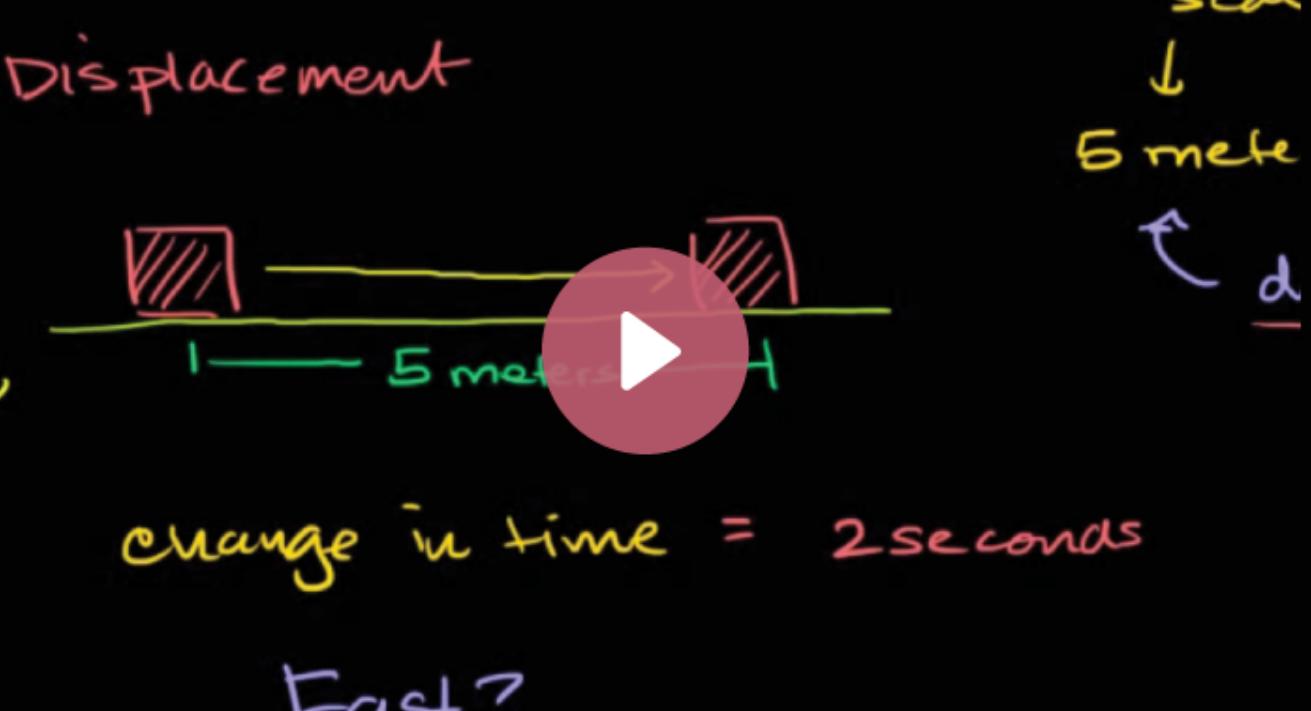
Displacement is a vector.

This means it has a direction as well as a magnitude and is represented visually as an arrow that points from the initial position to the final position. For example consider the professor that walks with relative to the whiteboard in the figure below.



PHYSICS | ONE-DIMENSIONAL MOTION | DISPLACEMENT, VELOCITY, AND TIME

Calculating average velocity or speed



Example of calculating average velocity and speed. Written by Sal Khan.

EL Ask a question...

Discussion

TOP RECENT

lalizelizabeth · 3 days ago
Where would it be important to be able to distinguish scalars from vectors?

Show More

Tags

Velocity Scalars Physics Distance Displacement

Recommended

6 m/s → 2 m/s →
7:09

Instantaneous speed and velocity
Displacement, Velocity, and Time

ARTICLE

What are position vs. time graphs?
Displacement, Velocity, and Time

derivative
 $\frac{d}{dx} [x^2] = 2x$
7:09

Antiderivatives and indefinite integrals
Integrals / Indefinite Integral as anti-derivative

7:09

Vector representations exercise example
Precalculus / Vectors / Vector Basics

7:09

Introduction to vectors and scalars
Displacement, Velocity, and Time

“But horizontal playlists are so **WEIRD!** YouTube doesn’t do that!”

Various stakeholders



Miu Lavis Calcl Inbo abou Medi 002. Musi Azze Mess The F Inbo horiz Resp siteln Elizabeth

www.nytimes.com/2015/10/13/fashion/azzedine-alaia-goes-in-a-different-direction-his-own.html?ref=fashion&r=0

FASHION & STYLE | Azzedine Alaïa Goes in a Different Direction: His Own

do Tisci
ON THE RUNWAY
Azzedine Alaïa Goes in a Different Direction: His Own

Paris Fashion Week: Portfolio

FIRST PERSON
The Unexpected Bat Mitzvah

FIELD NOTES
The Stepfather and the Wedding: A Family's Viral Story Still Hits Home

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dress rehearsal at 11 the night before I left Paris — it probably seemed a bit like a portent.

Because while [Mr. Alaïa's work in the 1980s](#) — tight, bandaged, body-celebratory — proved something of an “inspiration” to designers such as Olivier Rousteing at Balmain and Peter Dundas at [Roberto Cavalli](#) this season (indeed, when it came to the latter, so much of an inspiration that it [made Instagram](#)), the man himself has moved on pretty dramatically.

“Move” being the operative word.

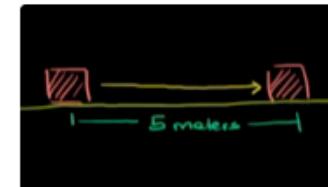
Dresses — seamed to trace the body but not to trap it — came with backs transformed into capes that flew away from the shoulder blades and shadowed the curve of exposed spine; thin-knit tunics were trimmed in raffia-like lacy fringing; jackets were cropped in at the waist and bloused out at the back like truncated sack dresses; and a crisp white sleeveless shirt was cut with precision lines to tent out from collarbone to hip over a plissé long skirt. Also a shirtdress, full of swing.

And then there were the pants.

Lots of pants. Pants cut wide with a perfect crease down the front. Pants worn with big ruffled blouses. Pants in a geometric print with matching bombers. Pants with a cropped gold top, like a cooler tux. More pants than Mr. Alaïa has done in a decade plus. And, to go with them, sneakers.

All the better to stride forward, you know. Whatever the schedule.





1. Introduction to vectors and scalars

Distance, displacement, sp...



2. What is displacement?

In physics, we love precisely...

$$v = \frac{s}{\Delta t} \text{ or change in time}$$
$$\vec{v} = \frac{5 \text{ km north}}{1 \text{ hour}} = \frac{5}{1} \text{ km/h}$$

3. Calculating average velocity or speed

Example of calculating sp...

$$t \cdot \vec{v} = \frac{s}{r}$$
$$t = \frac{720 \text{ m}}{8 \frac{\text{m}}{\text{s}}} = \frac{720}{8} \text{ s}$$

4. Solving for time

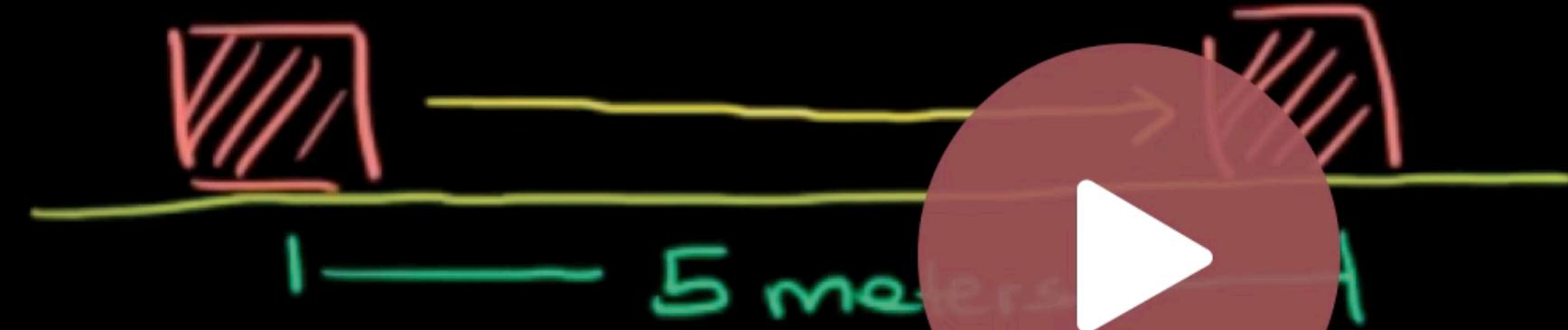
Simple example of solving for time given distance and rate

$$t = \vec{v} \cdot \frac{s}{r}$$

PHYSICS | ONE-DIMENSIONAL MOTION | DISPLACEMENT, VELOCITY, AND TIME

Calculating average velocity or speed

displacement



↓
5 met
↑

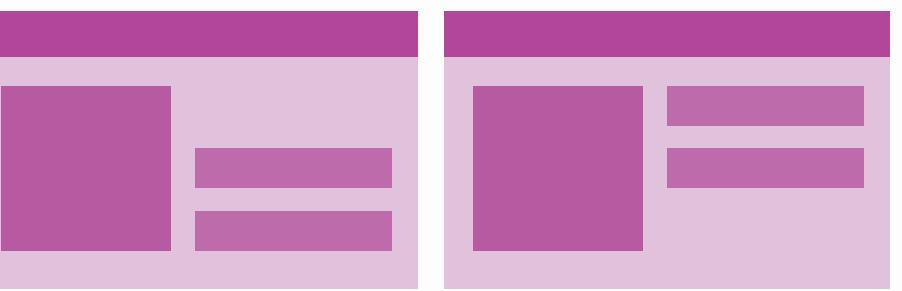
change in time = 2 seconds

t = 1?

I just said lots of words...



Save every iteration



Change one thing at a time



When stuck, zoom out



Thanks for listening!

elizabethylin.com • @lalizlabeth • elizabethylin@gmail.com