

# Material Design

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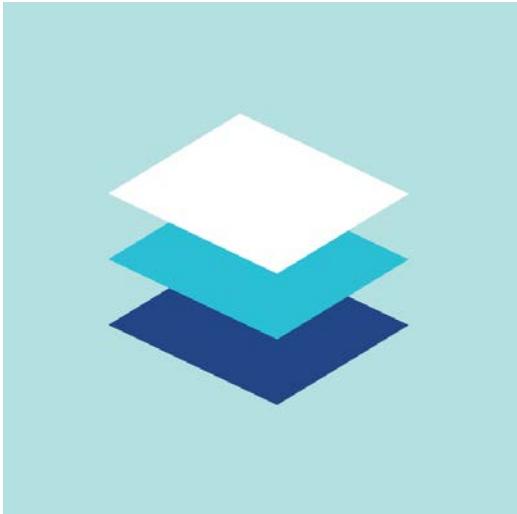


**Ajden Towfeek**  
TECHNICAL EVANGELIST

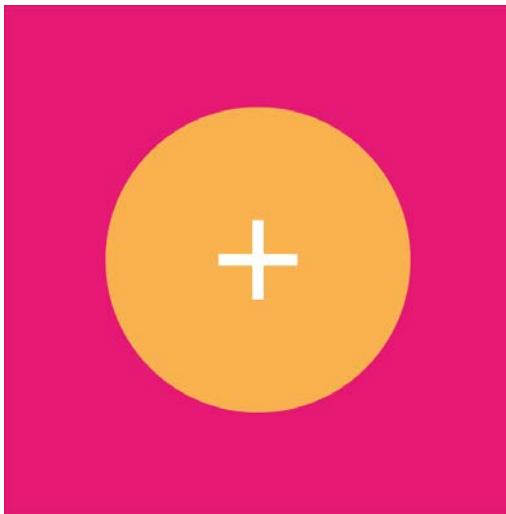
@ajtowf  
[towfeek.se](http://towfeek.se)  
[youtube.com/c/AjdenTowfeek](https://youtube.com/c/AjdenTowfeek)



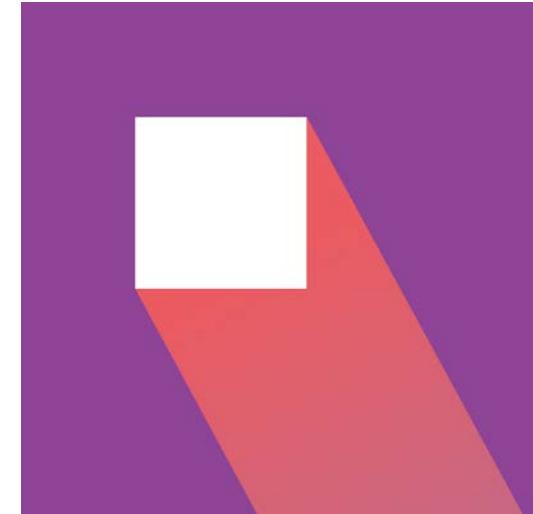
# Principles



**Material** is the  
metaphor



**Bold, graphic and  
intentional**



**Motion** provides  
meaning

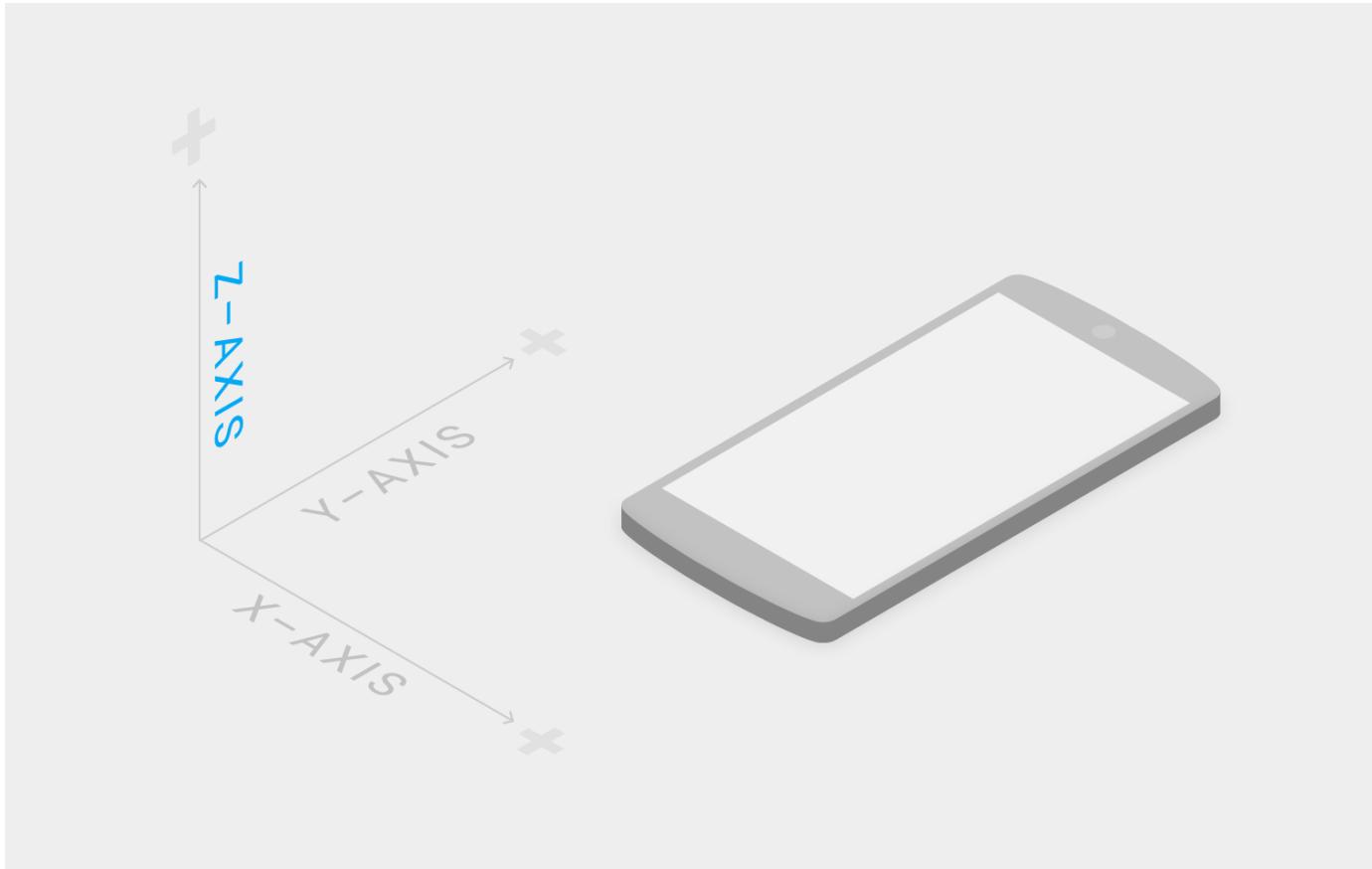


# What Is Material?

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# Environment



3D world



# Light and Shadow



**Shadow cast by the key light**



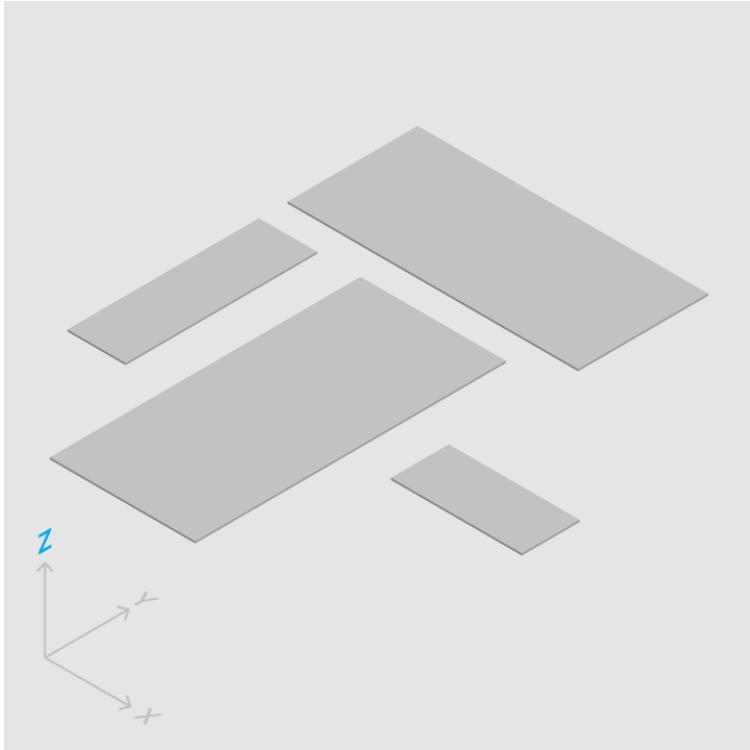
**Shadow cast by ambient light**



**Combined shadow from key and ambient lights**

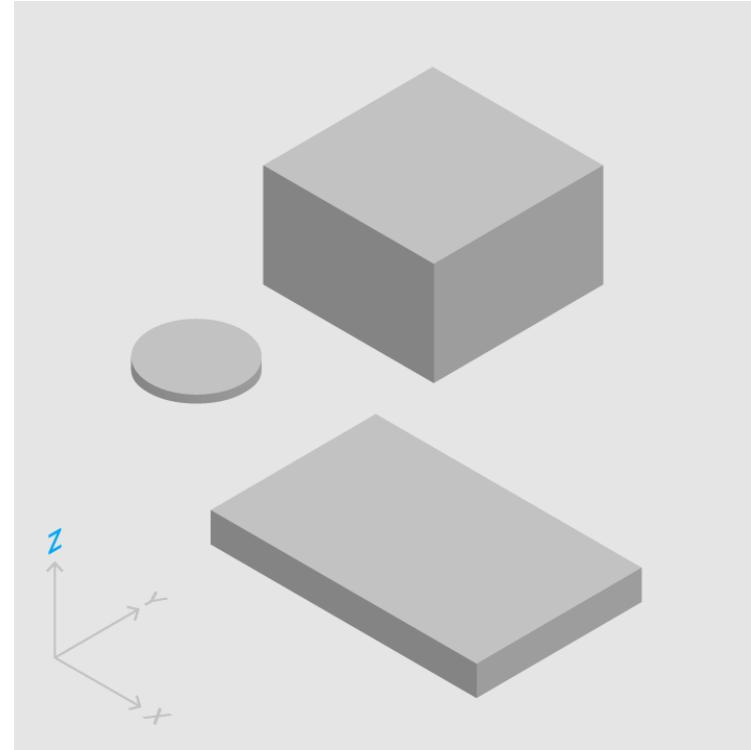


# Physical Properties



**Do.**

The height and width of material can vary.



**Don't.**

Material is always 1dp thick.



# Material Casts Shadows



**Do.**

Shadows depict the relative elevation between material elements.



# Material Casts Shadows



**Don't.**

**Shadows are never approximated by coloring material.**



# Content

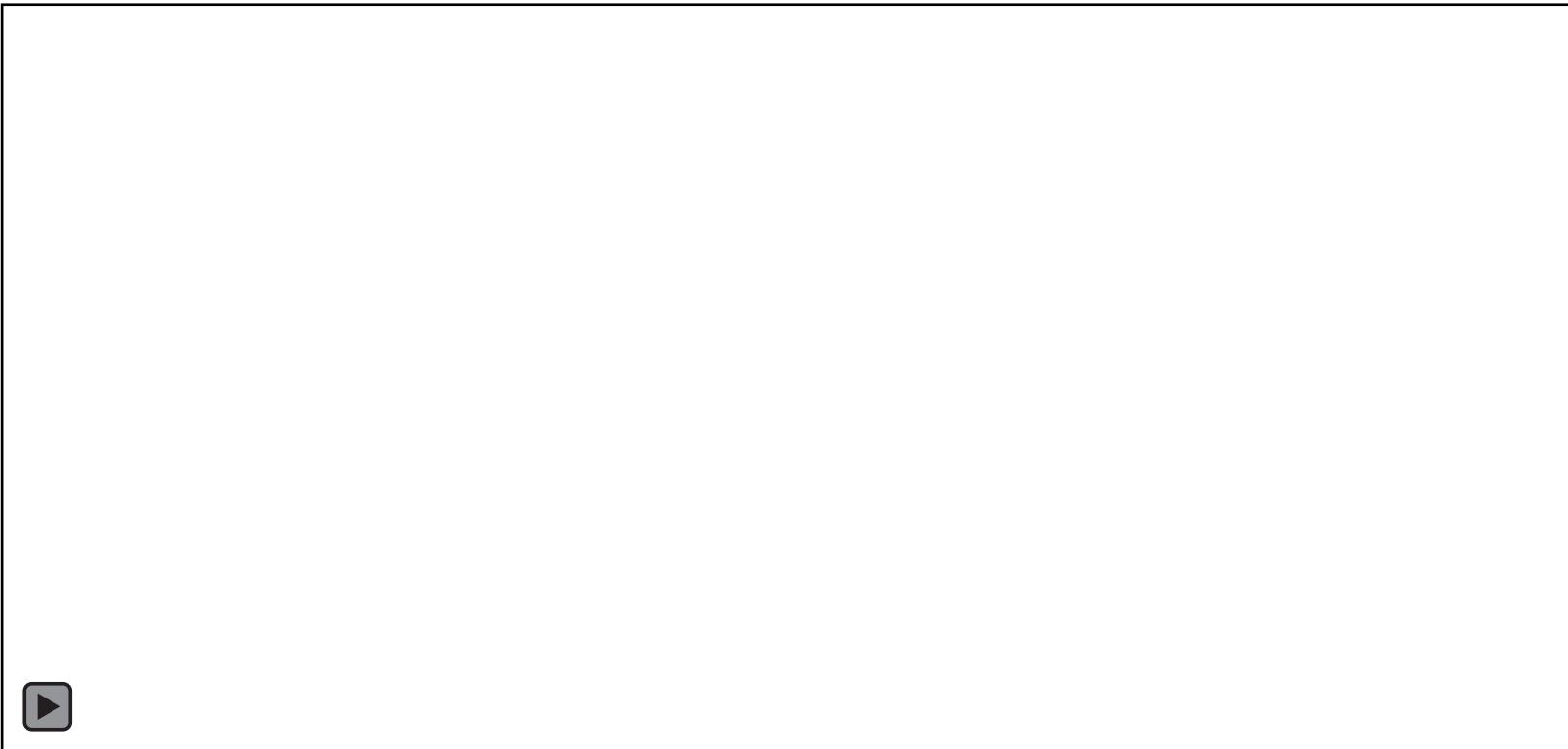


**Do.**

Material can display any shape and color.



# Content

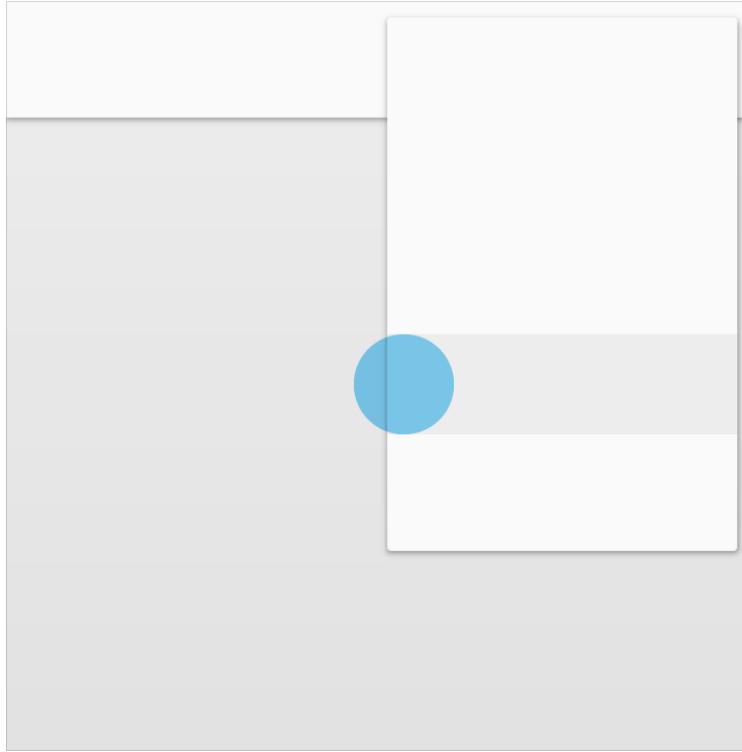


**Do.**

**Content behavior can be independent of the behavior of material.**

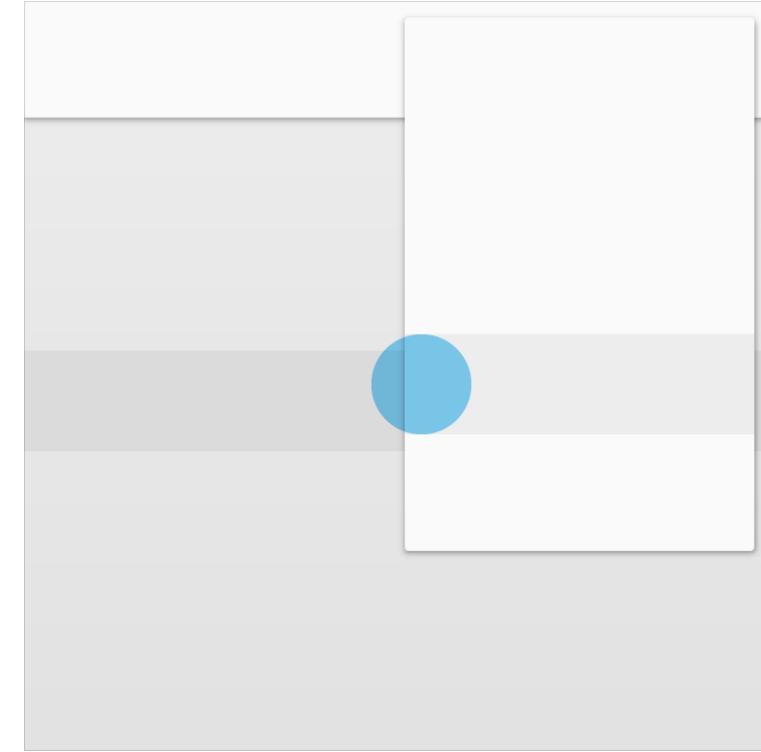


# Material Is Solid



**Do.**

**Input events only affect the foreground material.**

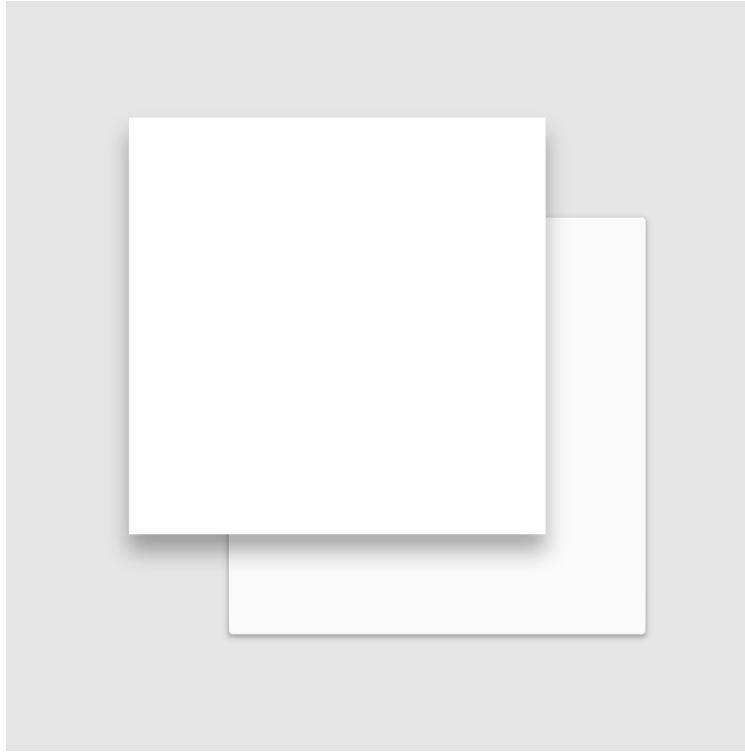


**Don't.**

**Input events cannot pass through material.**

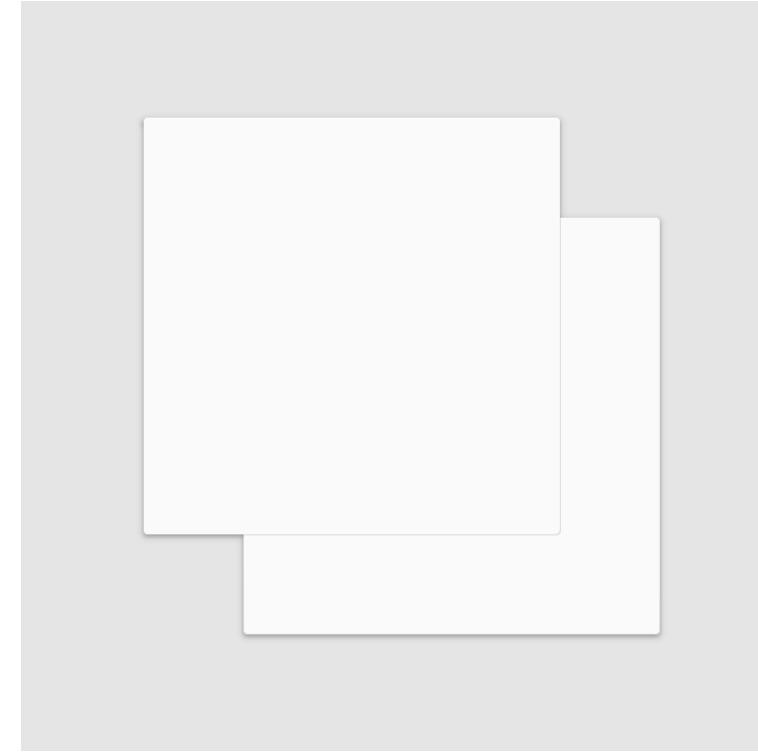


# Material Is Solid



**Do.**

Using elevation to separate material elements.



**Don't.**

Multiple material elements cannot occupy the same point in space simultaneously.



# Material Is Solid



**Don't.**

Material cannot pass through other material.



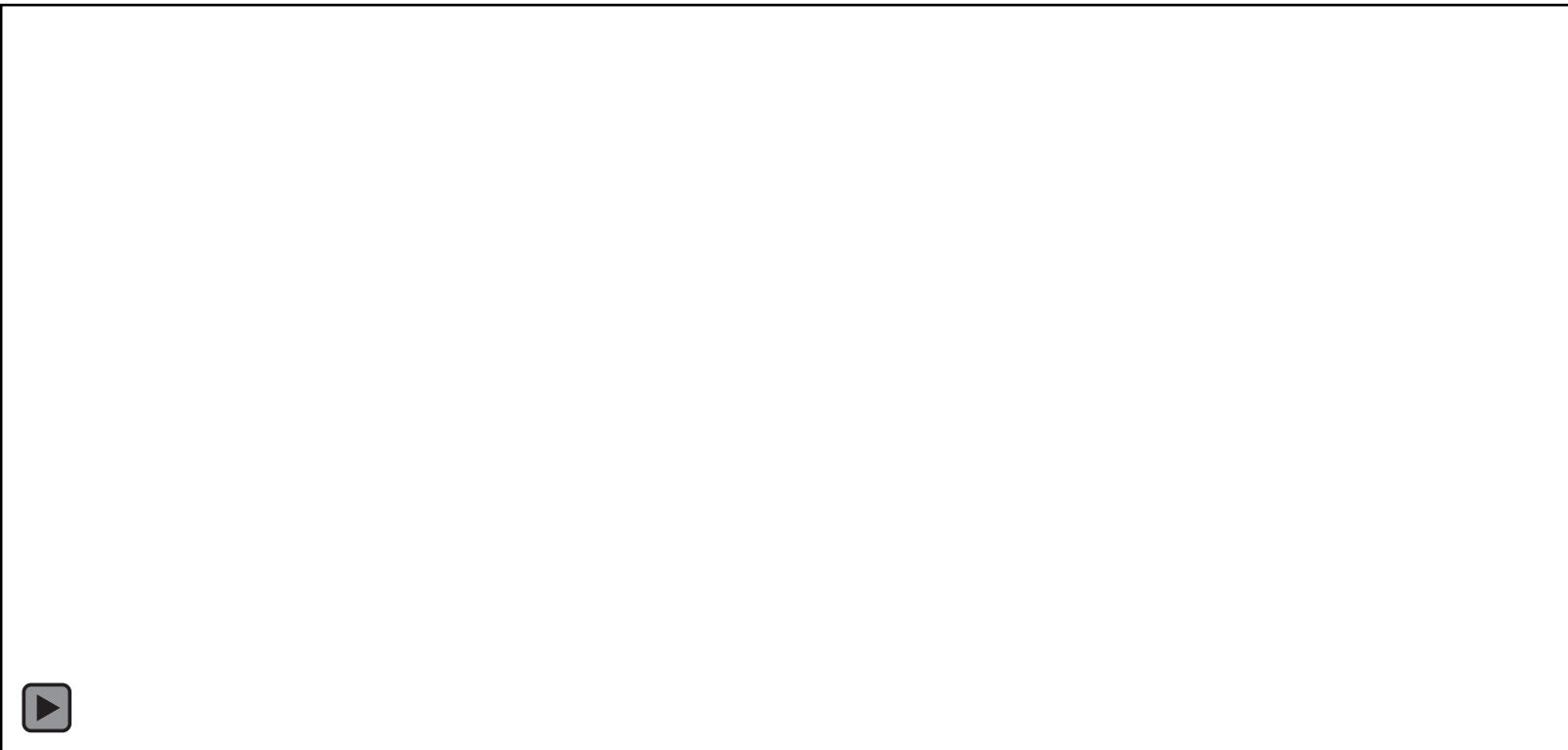
# Transforming Material



**Material can change shape.**



# Transforming Material

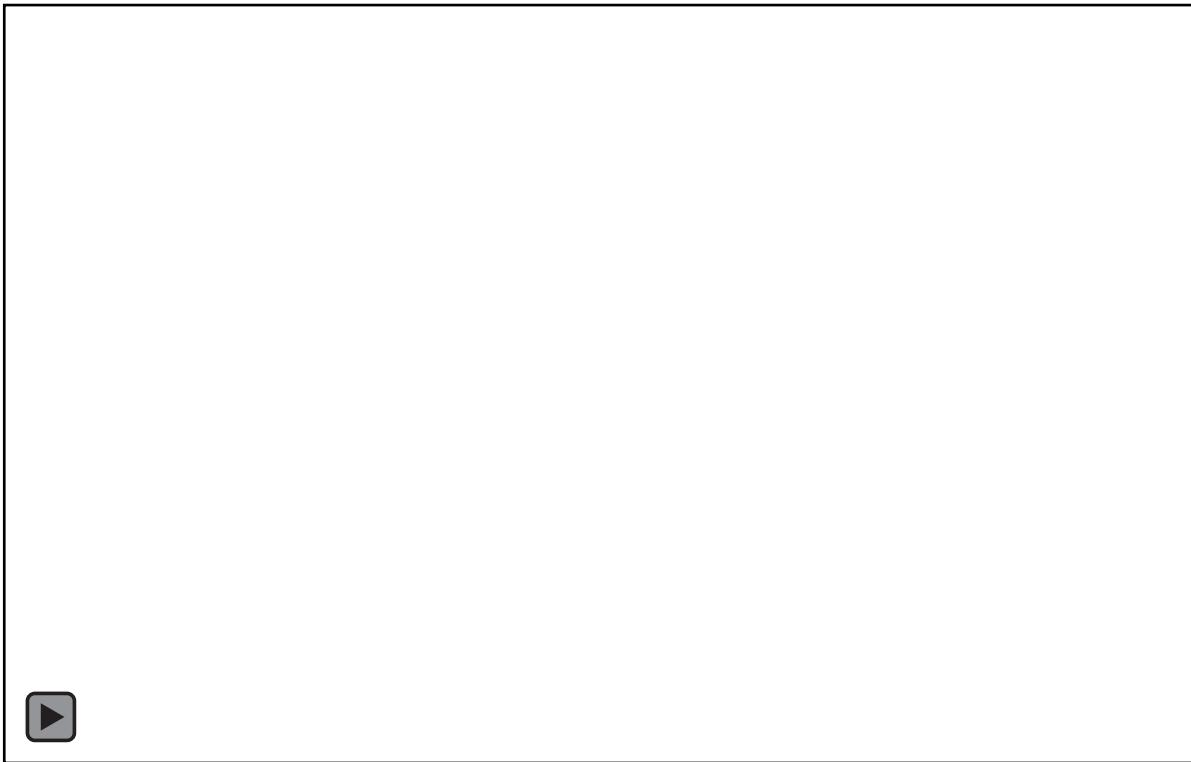


**Do.**

**Material grows and shrinks only along its plane.**



# Transforming Material

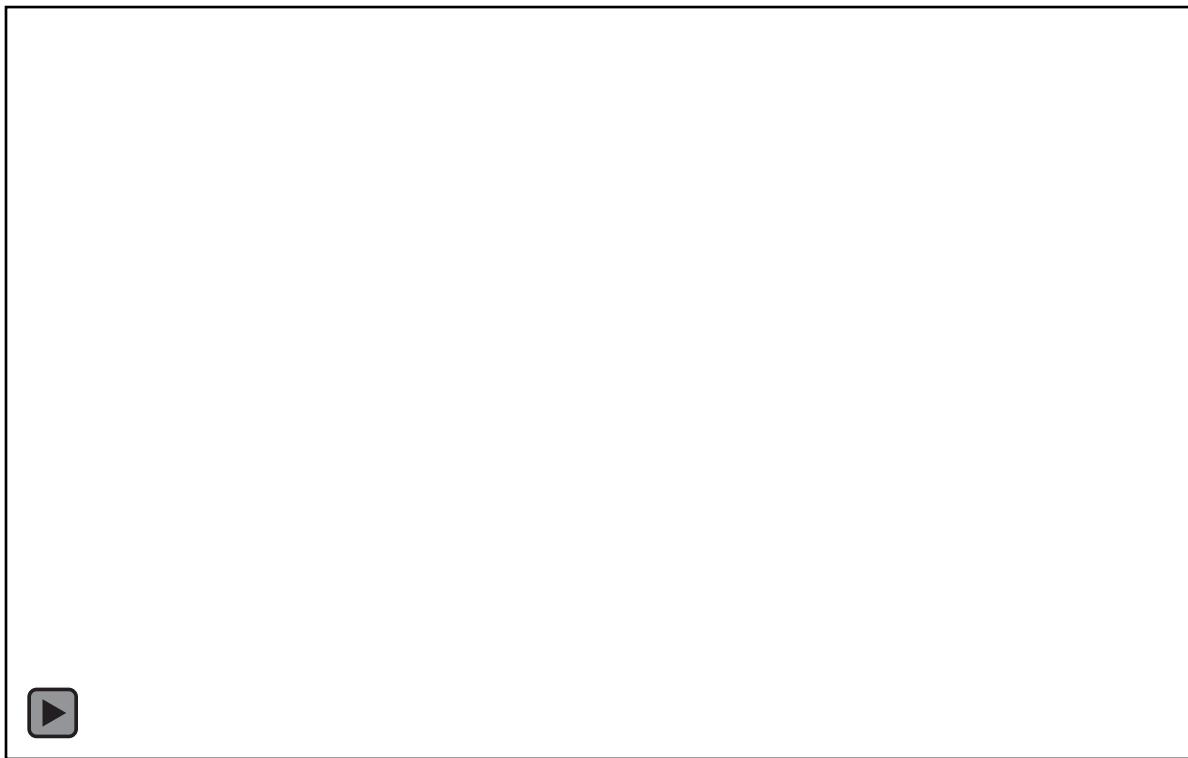


**Don't.**

Material never bends or folds.



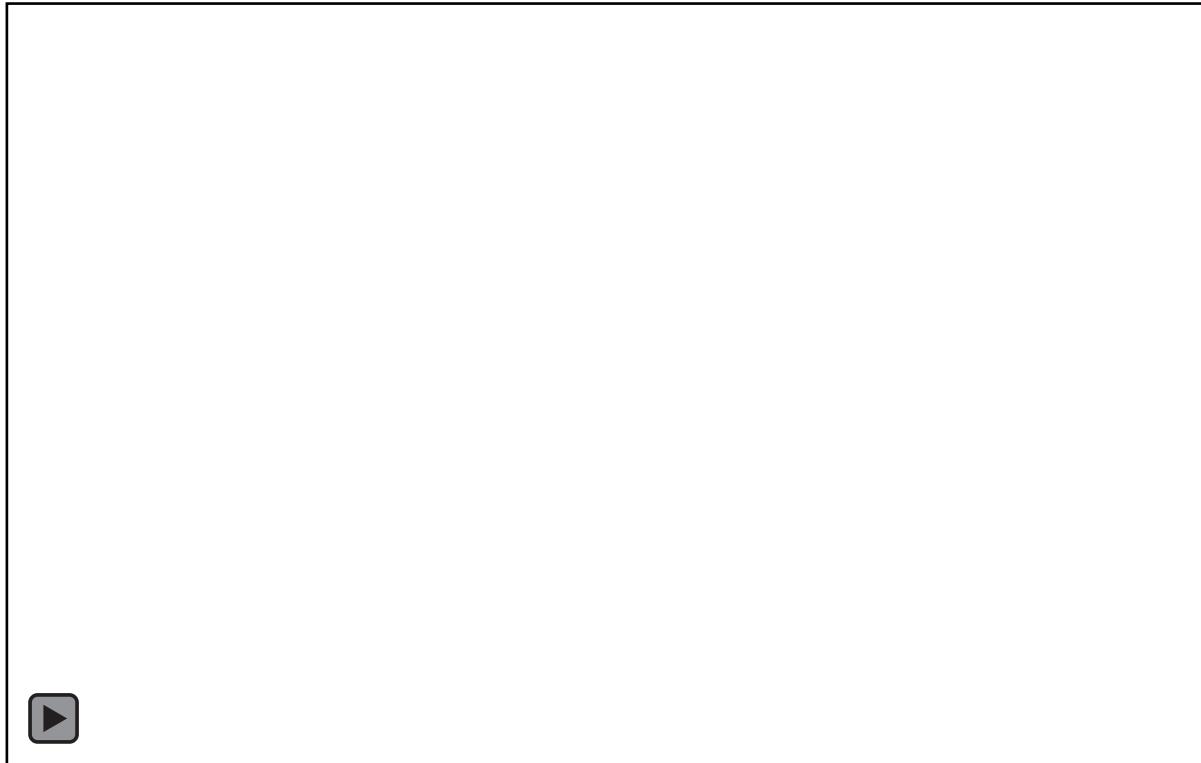
# Transforming Material



**Multiple sheets of material can join together to become a single sheet.**



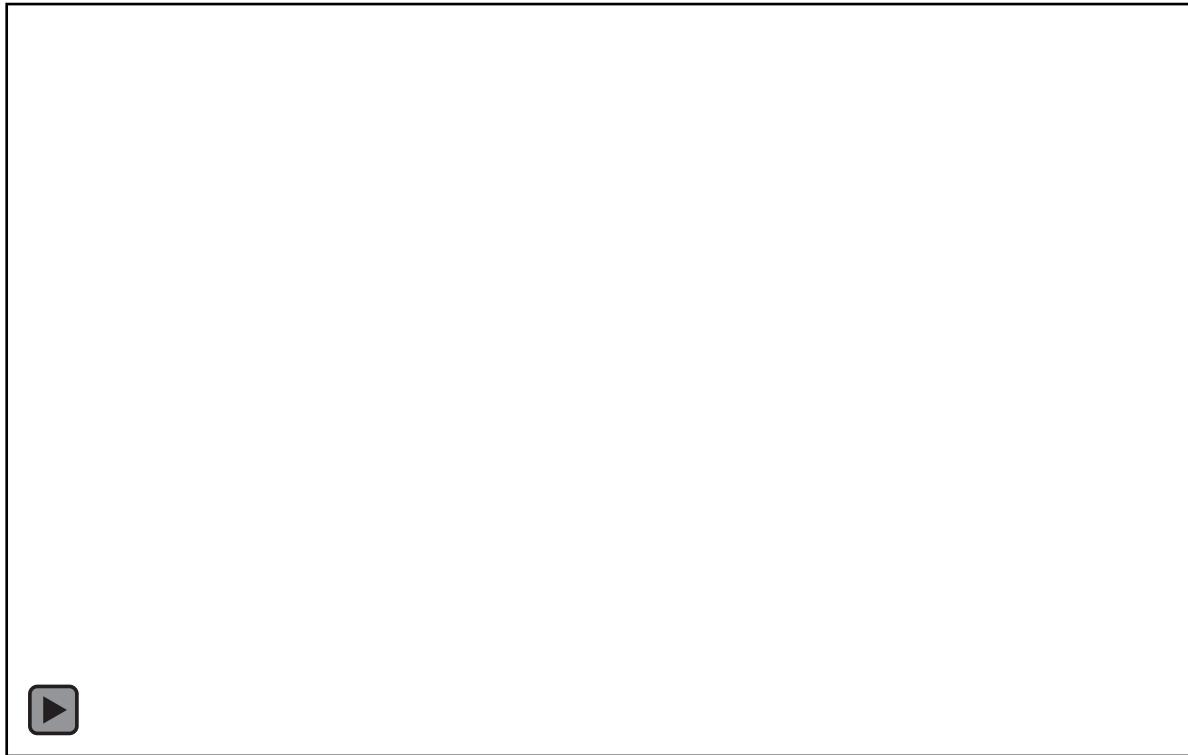
# Transforming Material



**Material can split and become whole again.**



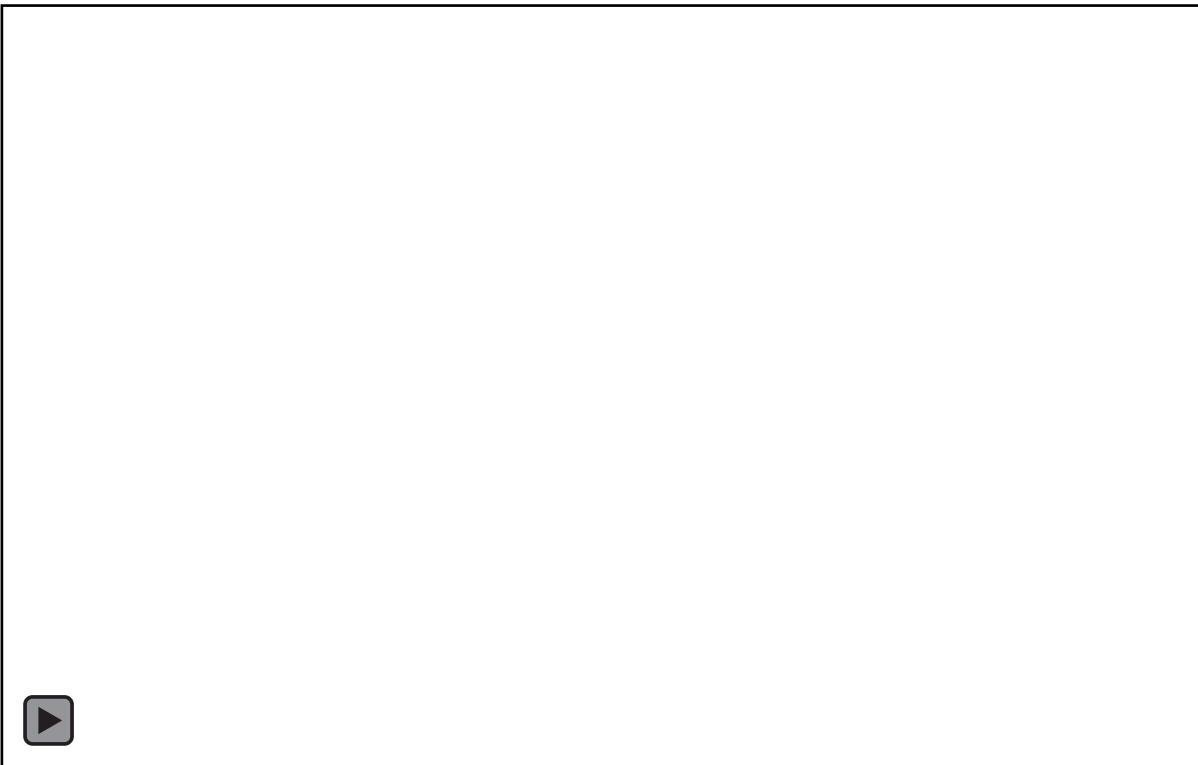
# Movement of Material



**Material can be spontaneously generated or destroyed.**



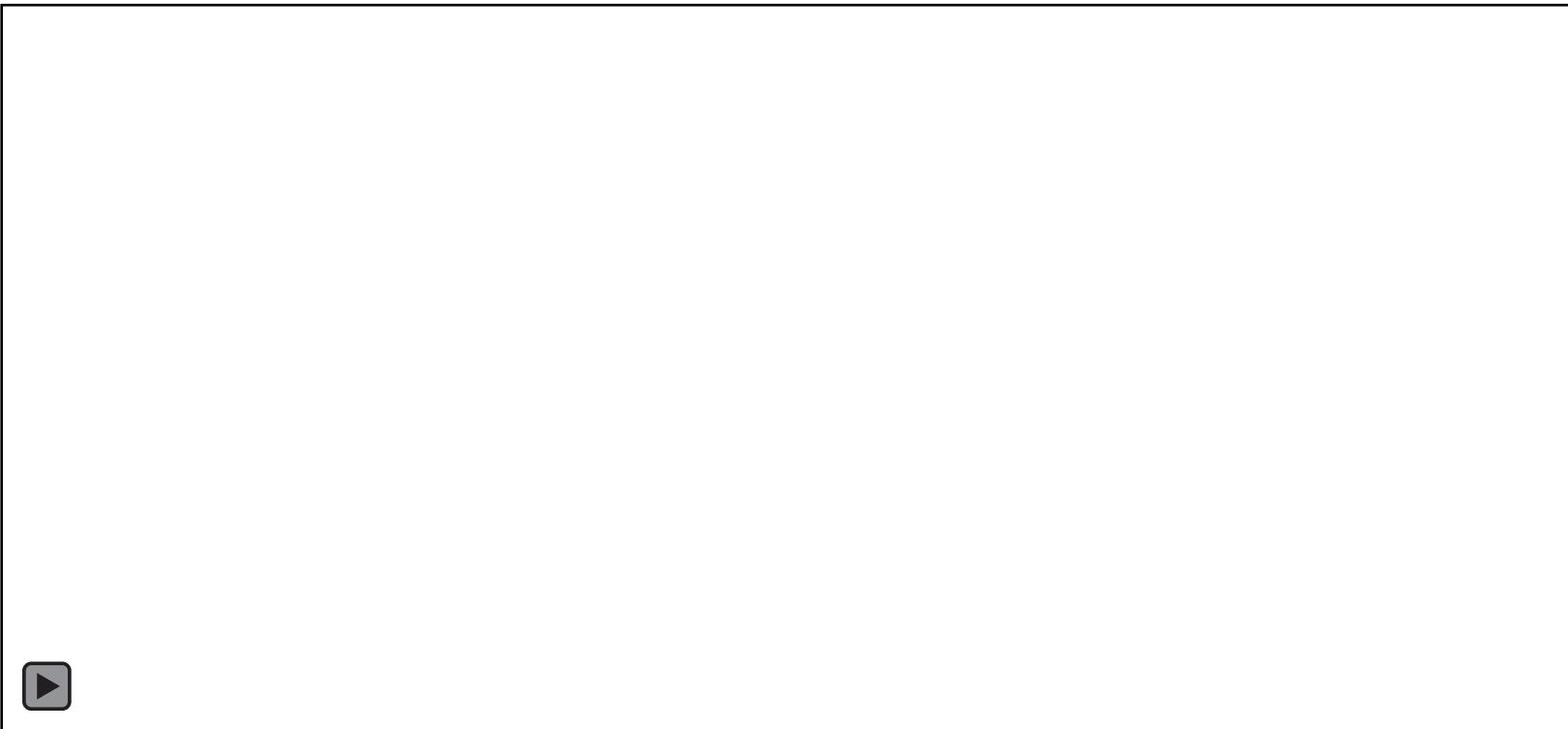
# Movement of Material



**Material can move along various axes.**



# Movement of Material



Z-axis motion prompted by user interaction.

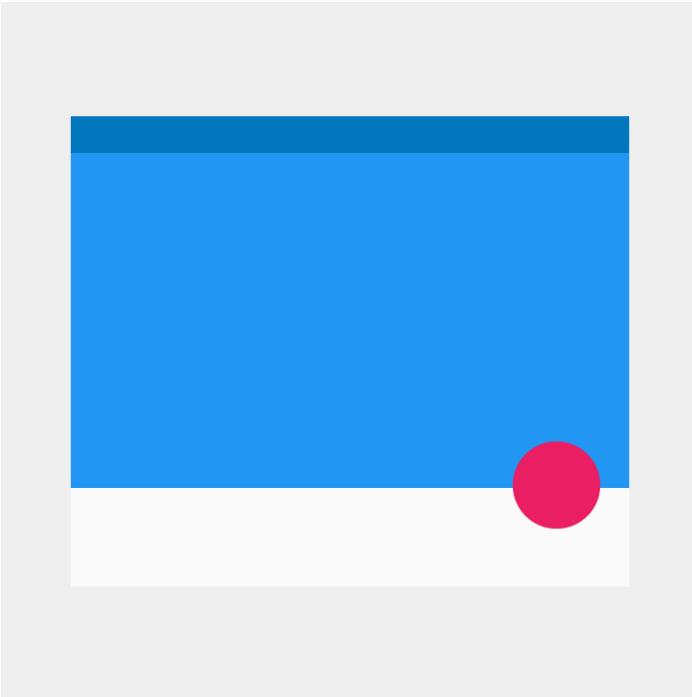


# Elevation and Shadows

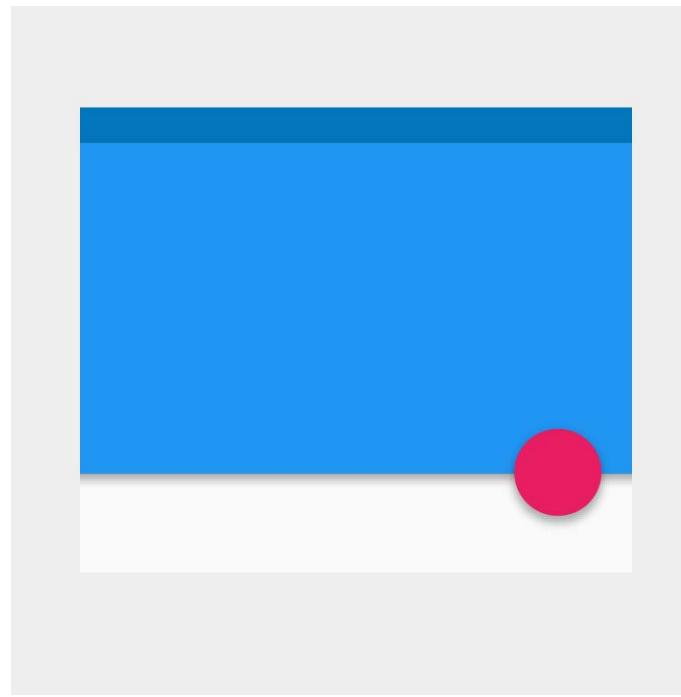
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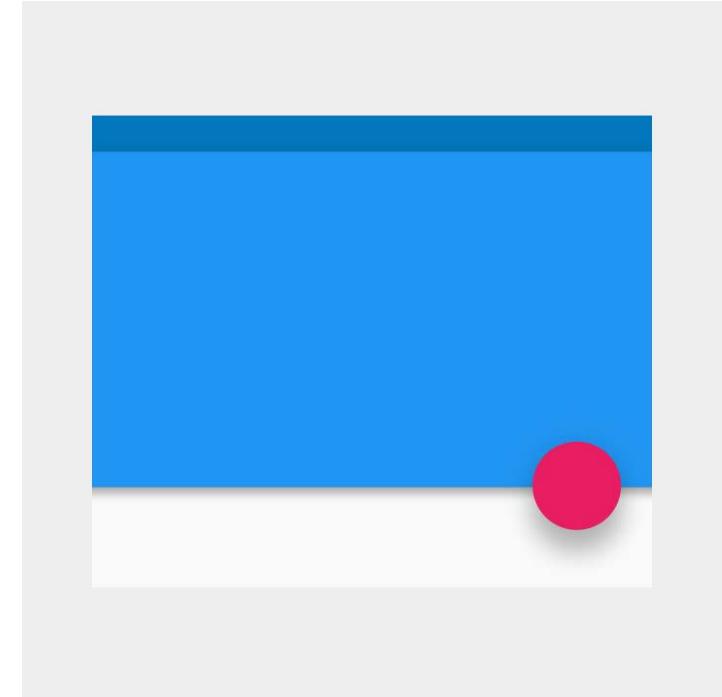
# Shadows



**Don't.**  
No shadows



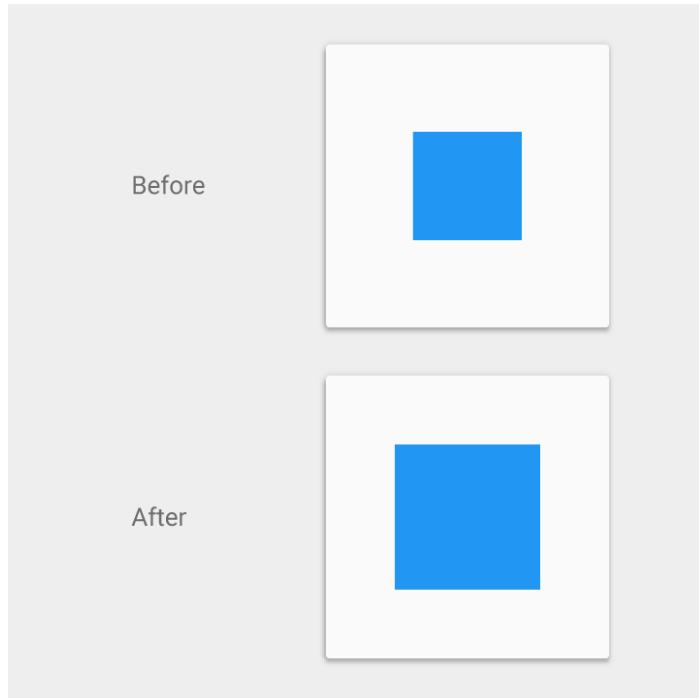
**Don't.**  
Crisp shadows



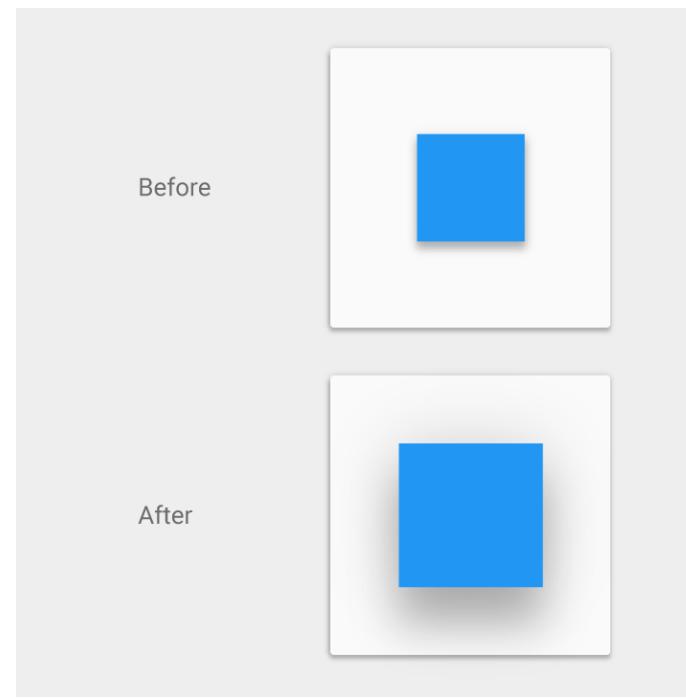
**Do.**  
Softer, larger shadows



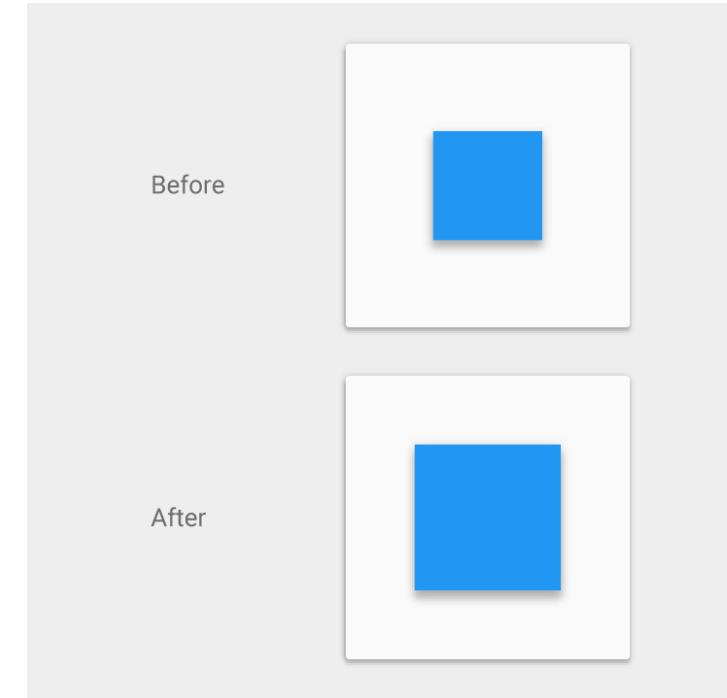
# Shadows



**Don't.**  
**No shadow**



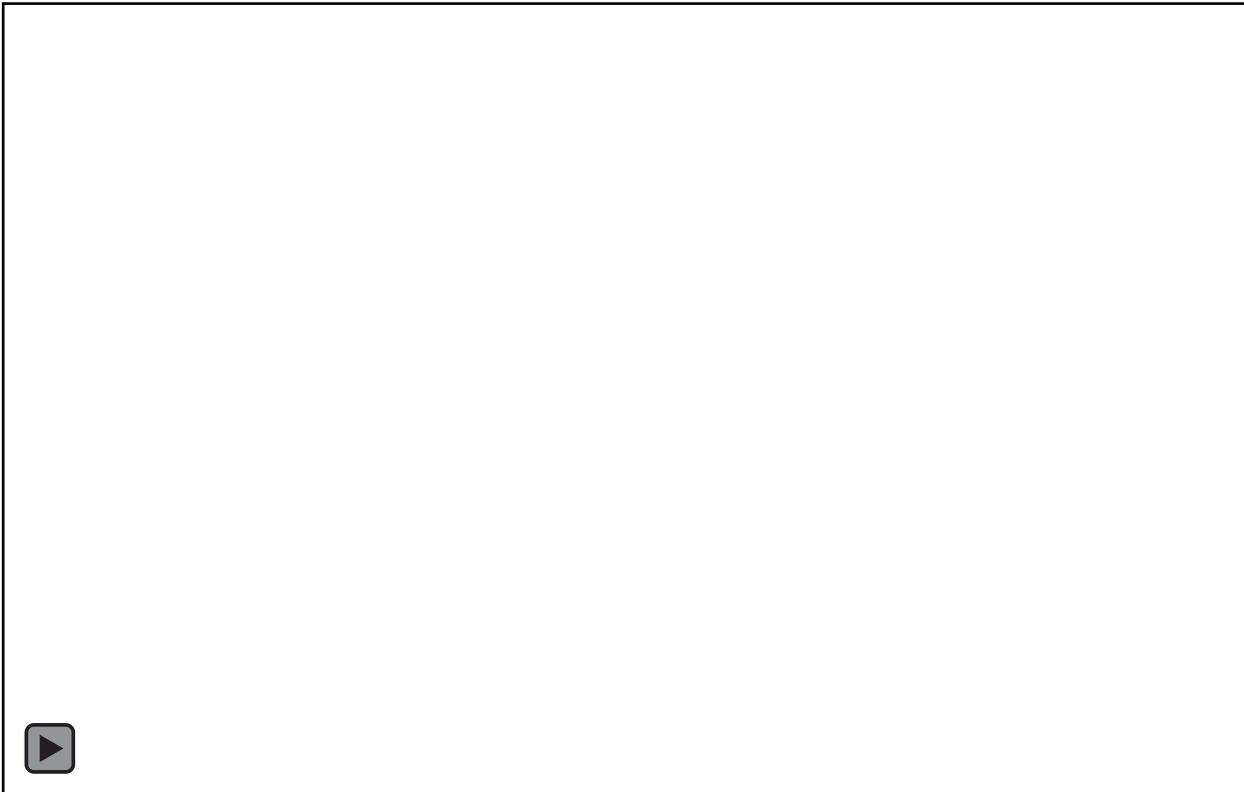
**Do.**  
**Shadow grows softer and larger**



**Do.**  
**Consistent shadow**



# Object Relationships



**As the parent sheet scrolls, the raised button (its child) scrolls off screen with it.**



# Parent-child Specifics

## Parent-child specifics

Each object has one parent.

Each object may have any number of children.

Children inherit transformative properties from their parent.

Siblings are objects at the same level of hierarchy.

## Exceptions

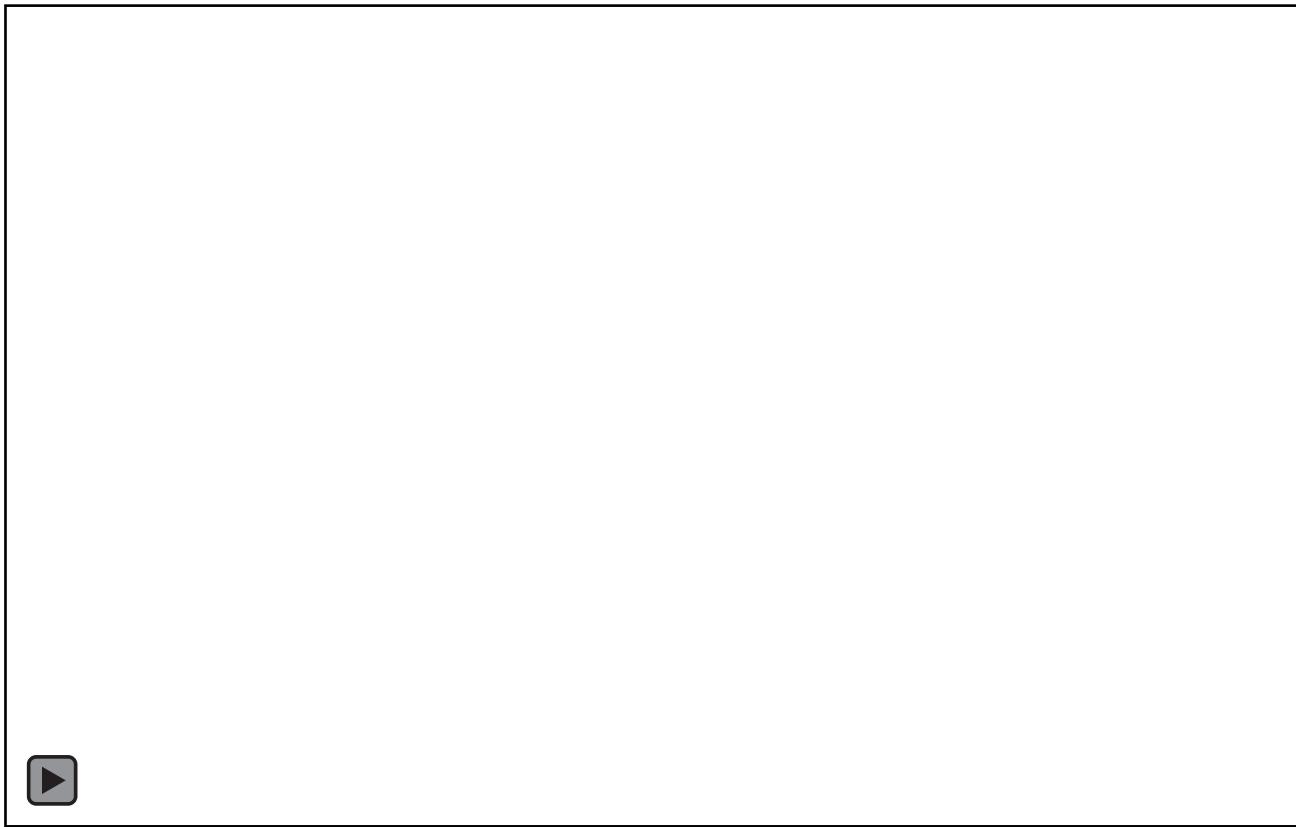
An app's side nav drawer

The action bar

Dialogs



# Interactions



**The floating action button remains in place because its parent is not being scrolled.**

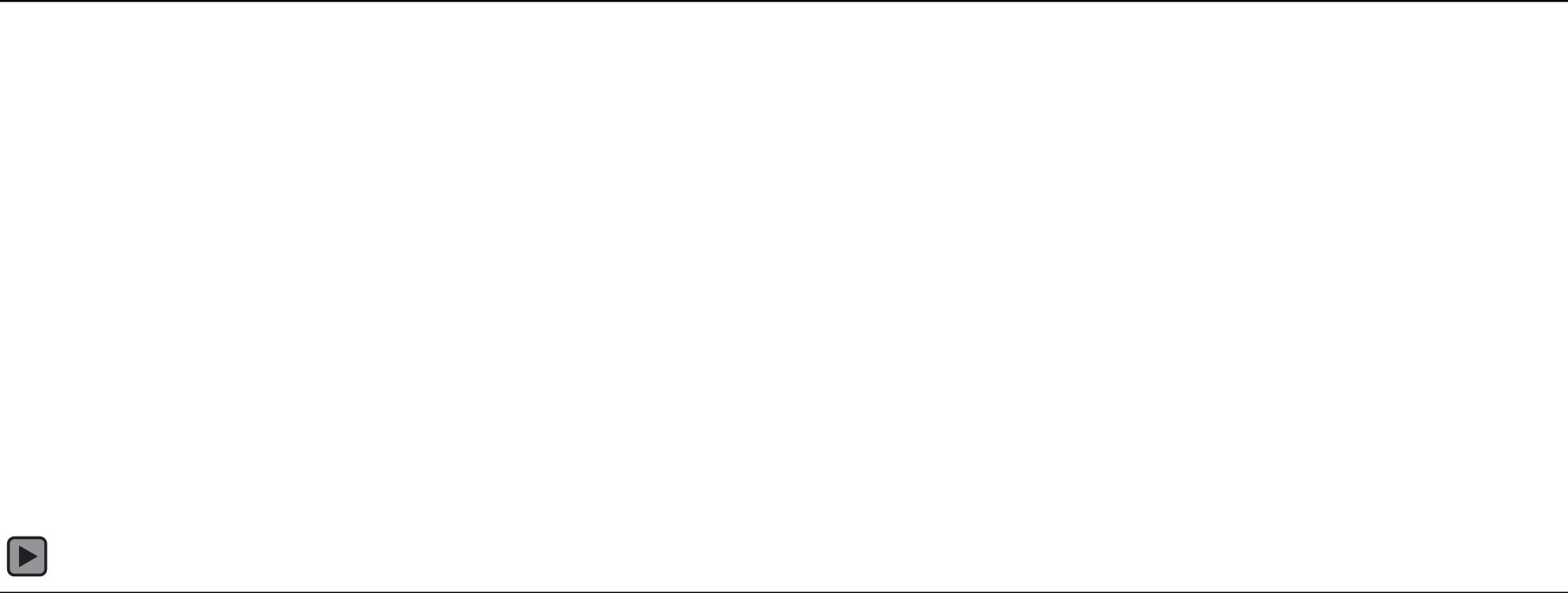


# Animation

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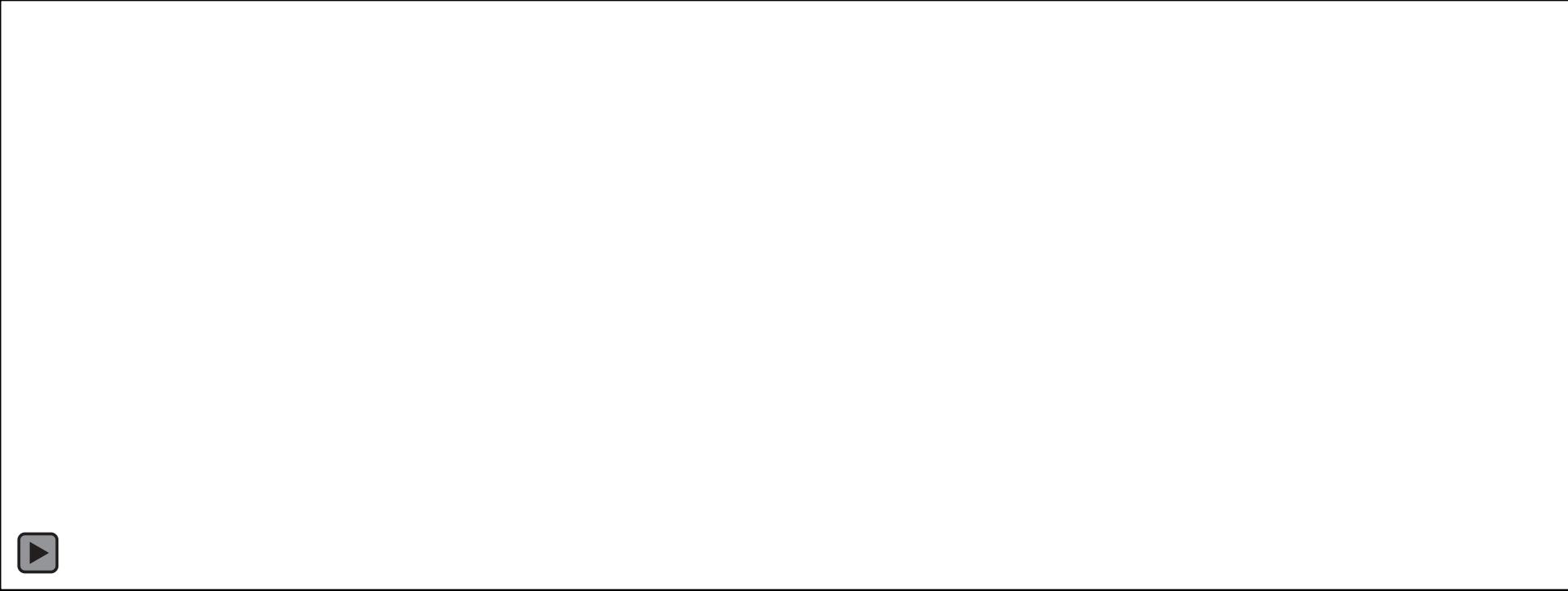
# Natural Acceleration and Deceleration



**Asymmetric acceleration and deceleration creates a more natural and delightful motion.**



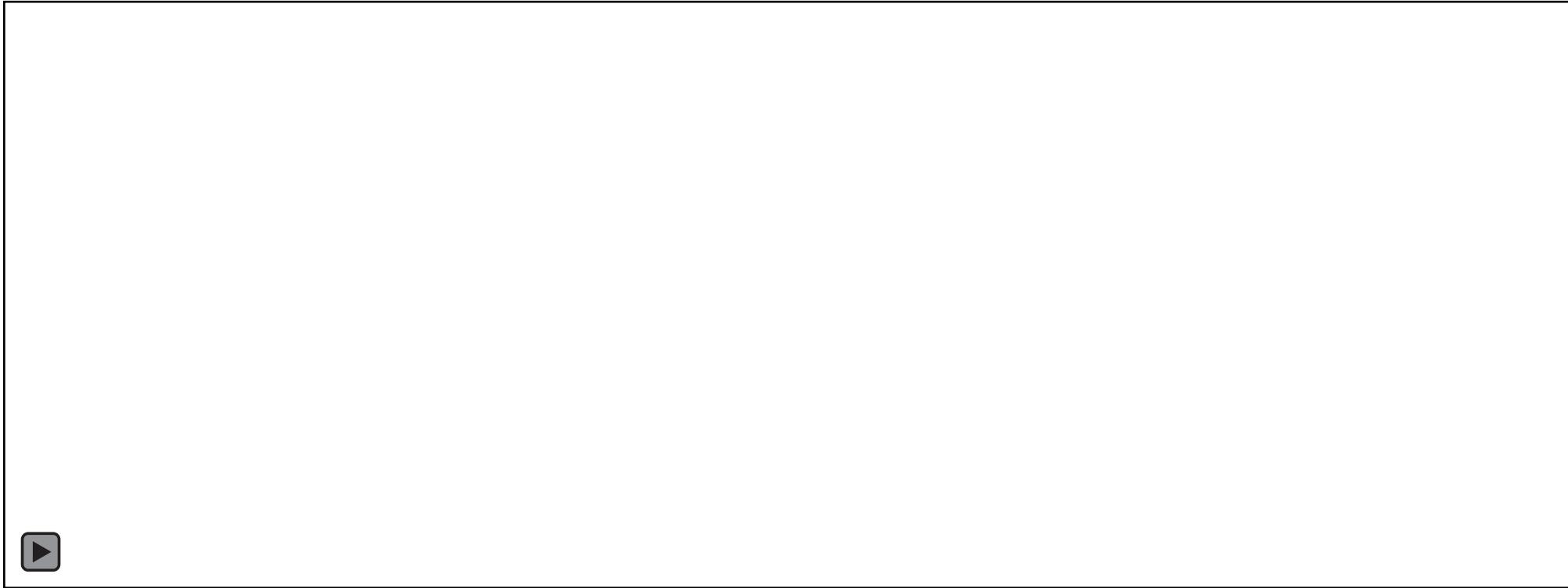
# Natural Acceleration and Deceleration



**Avoid linear motion.**



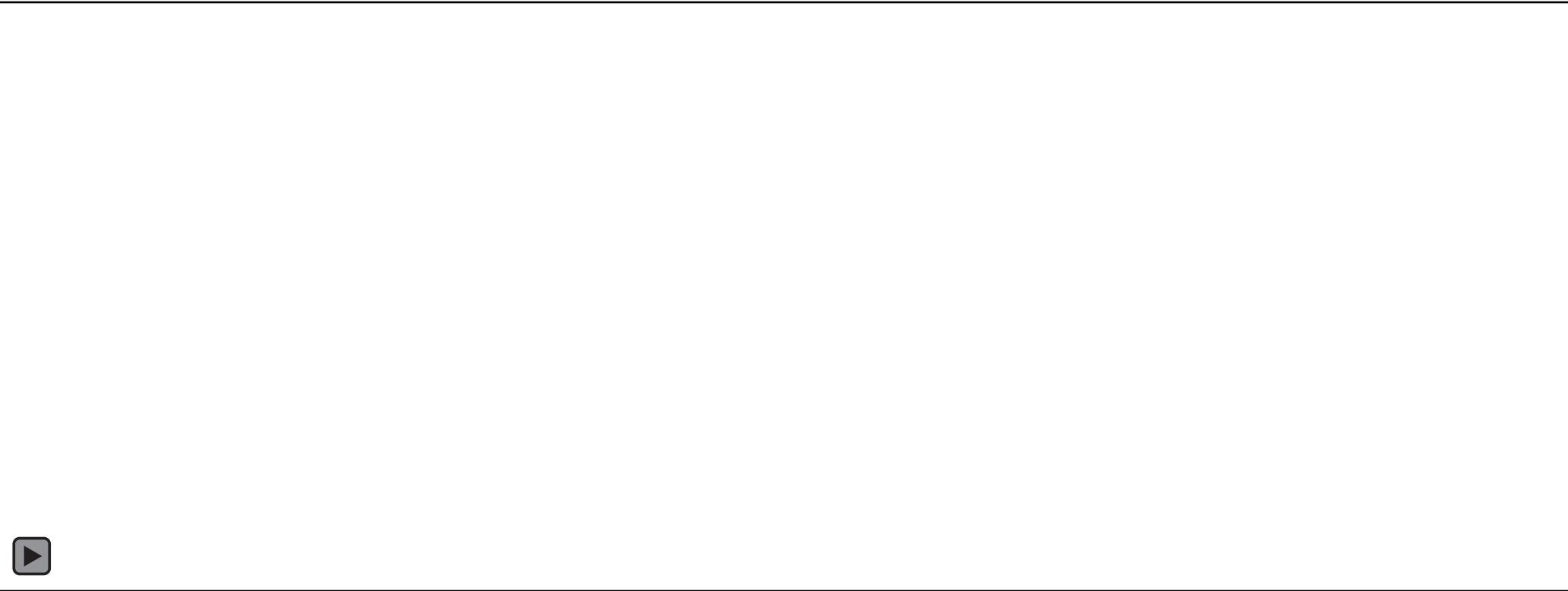
# Entrances and Exits



**Changes in the ball's speed emphasize its arrival at  
and departure from the resting position.**



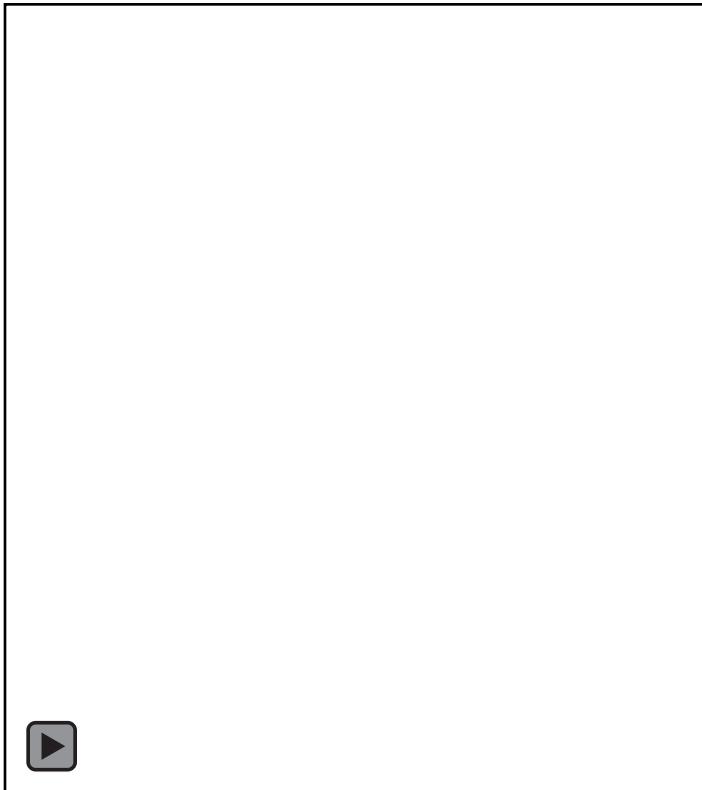
# Entrances and Exits



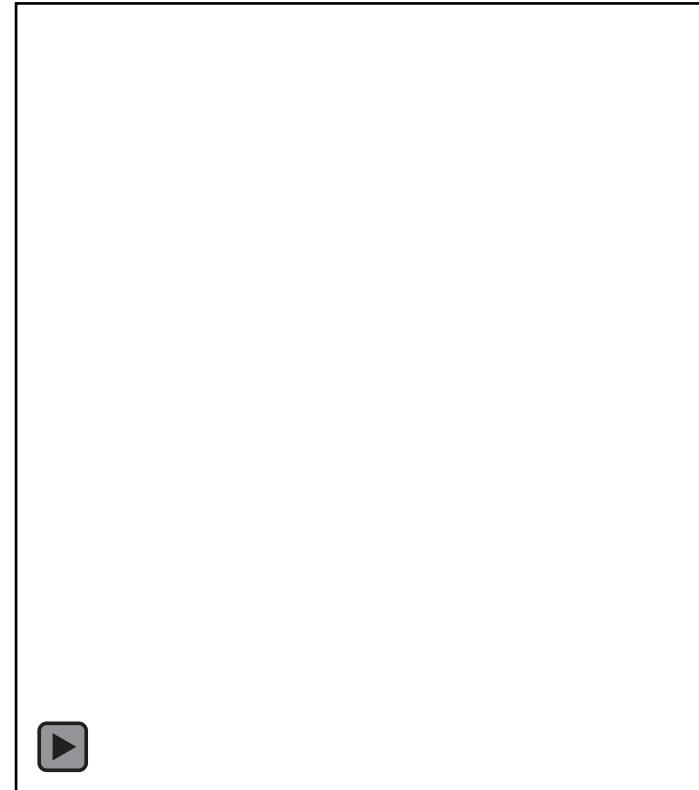
**Speeding up when entering, and slowing down when exiting, can draw unwanted attention and distract the user.**



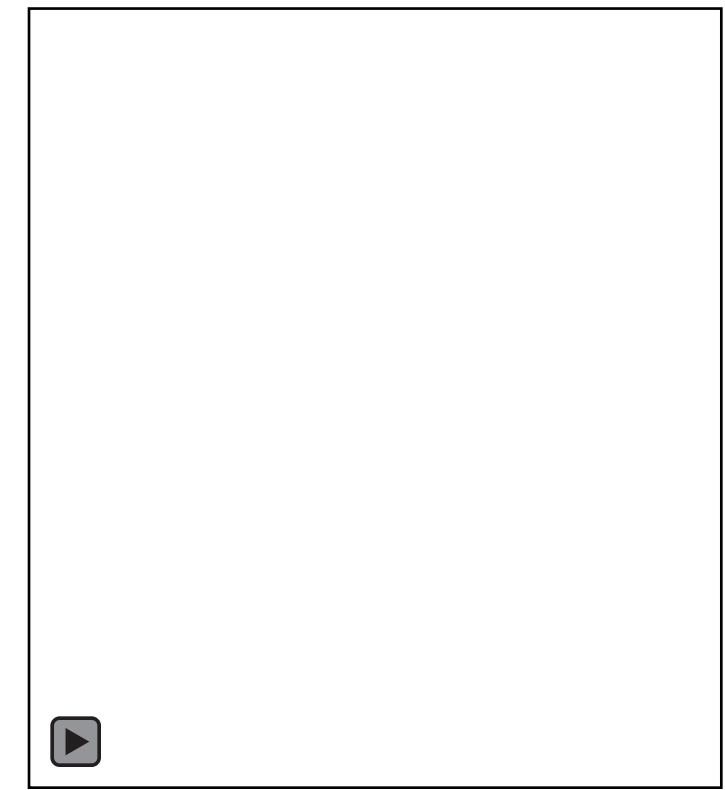
# User Input



Surface reaction



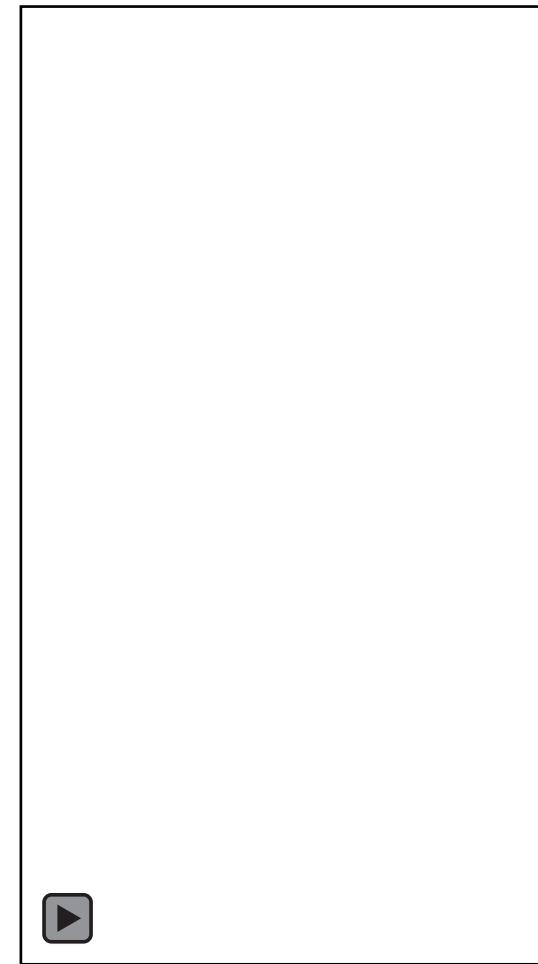
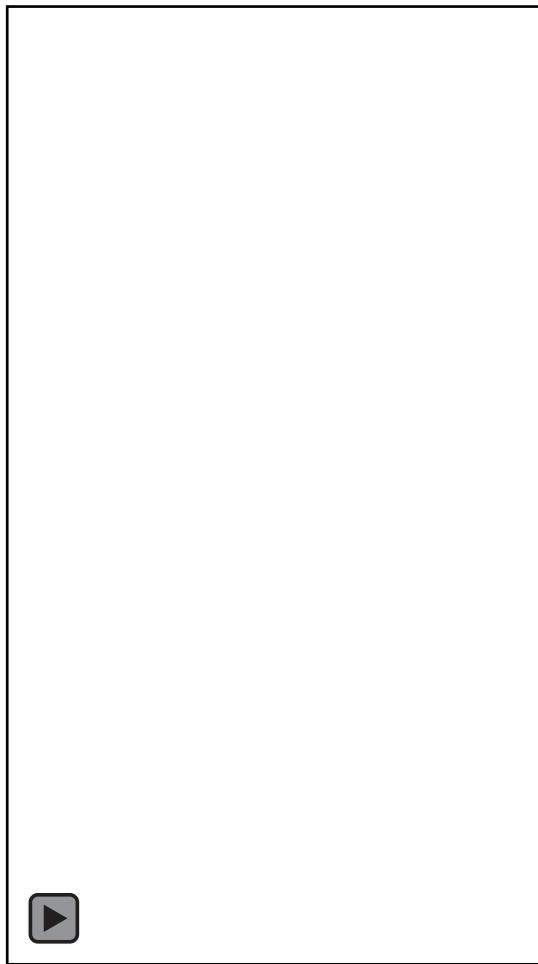
Material response



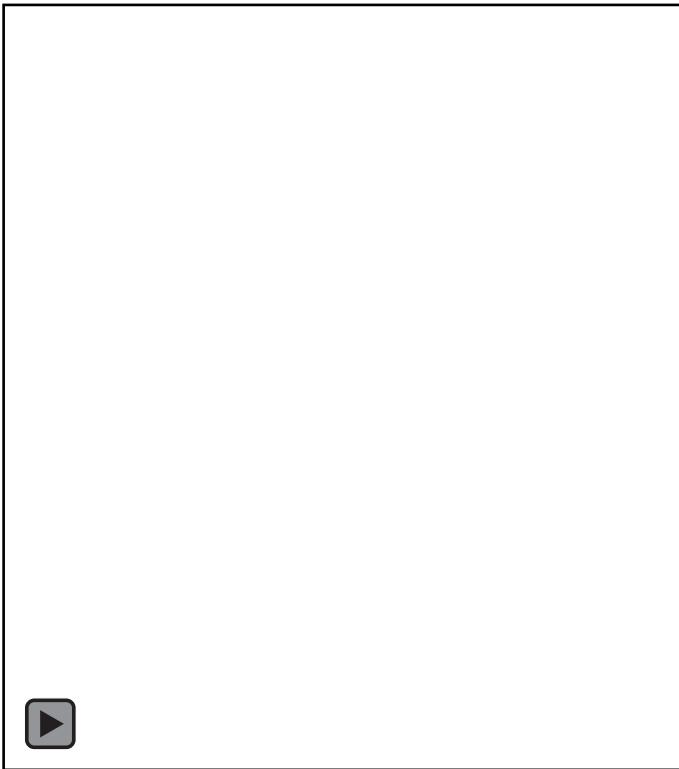
Radial reaction



# Surface Reaction

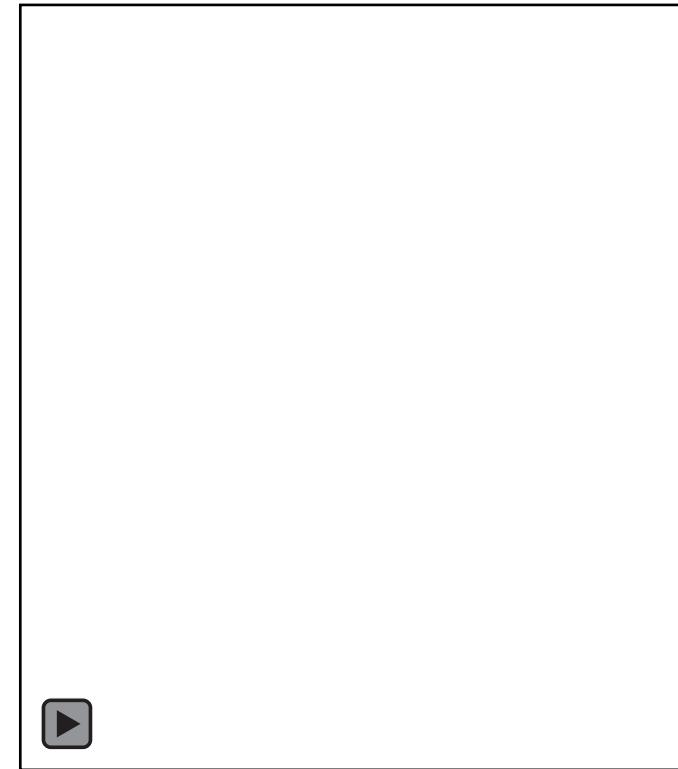


# Point of Origin



**Do.**

Material appears from the touch point, tying the element to the point of touch.

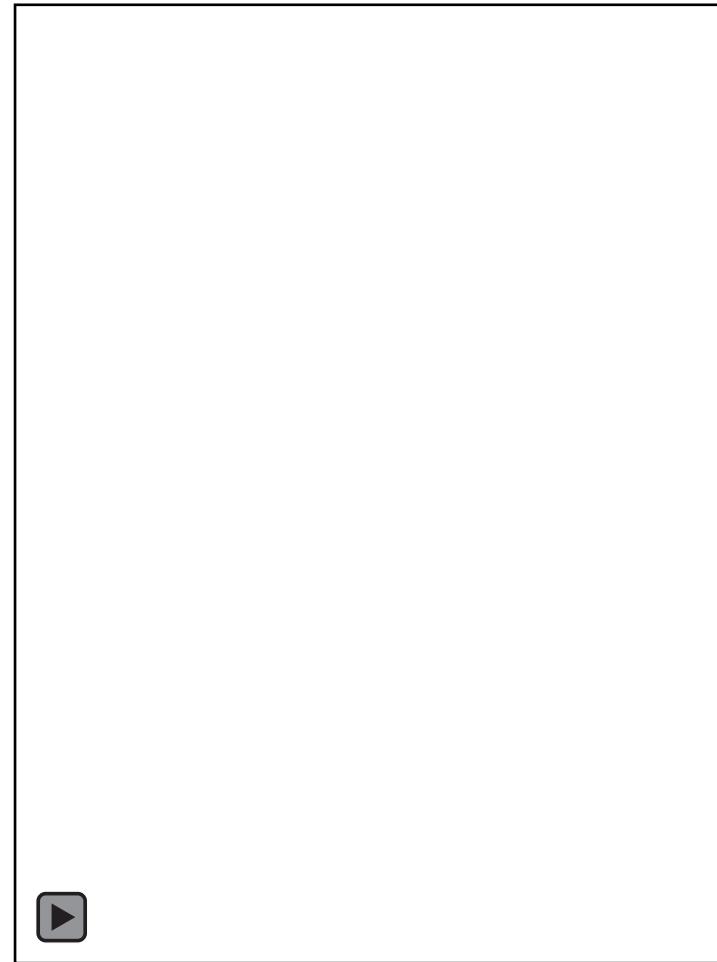


**Don't.**

Paper appears from the center of screen, breaking the relationship with the input.



# Lift on Touch



**Lift on touch**

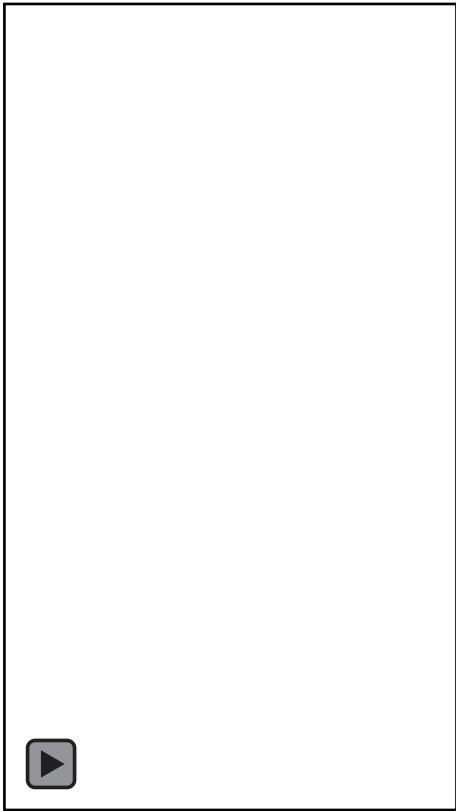


# Meaningful Transitions

**Direct user attention**  
**Connect transitions visually**  
**Use movement with precision**

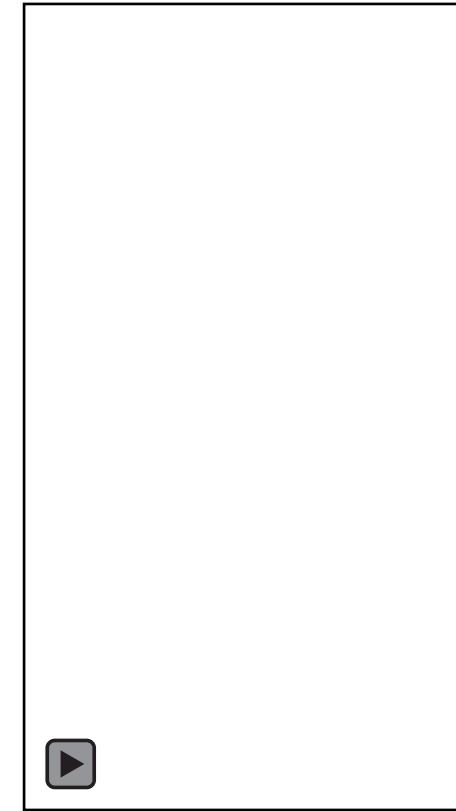


# Meaningful Transitions



**Do.**

Incoming material elements may expand into view, but content should only fade in.



**Don't.**

Hard cuts are jarring and require the user to do all the work in order to understand the transition.



# Hierarchical Timing



**Do.**

Use overlapping motion to direct user attention.

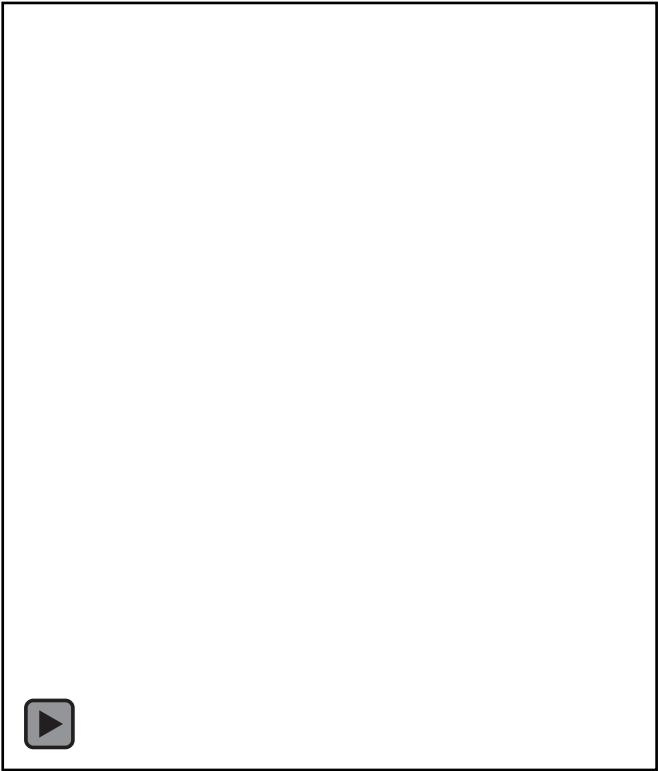


**Don't.**

Timing element transitions to occur at the same moment provides no indication of what is important.

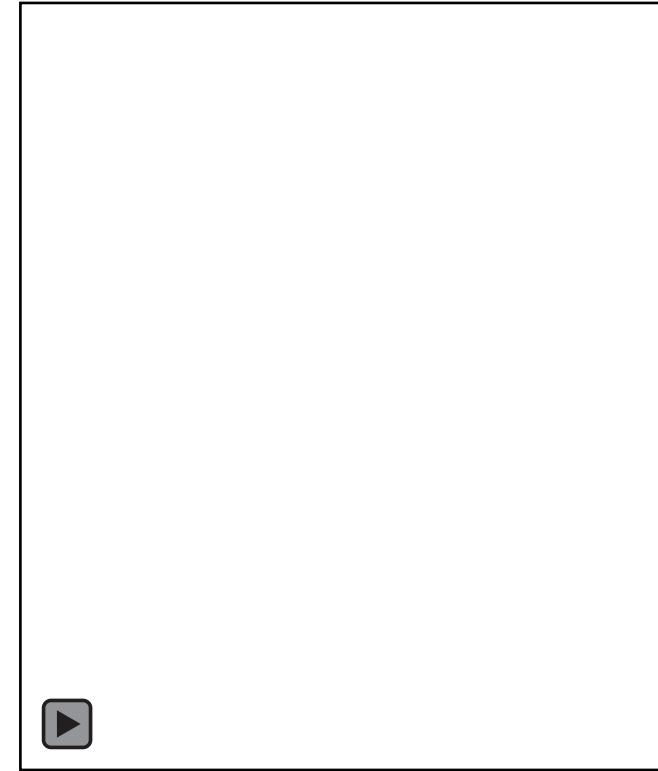


# Consistent Choreography



**Do.**

Direct user attention with coordinated, orderly motion.

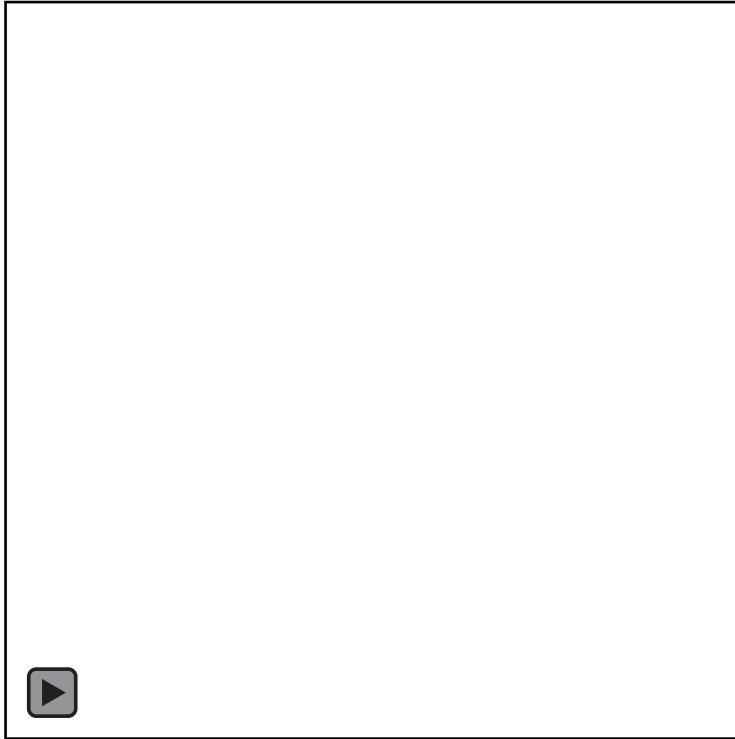


**Don't.**

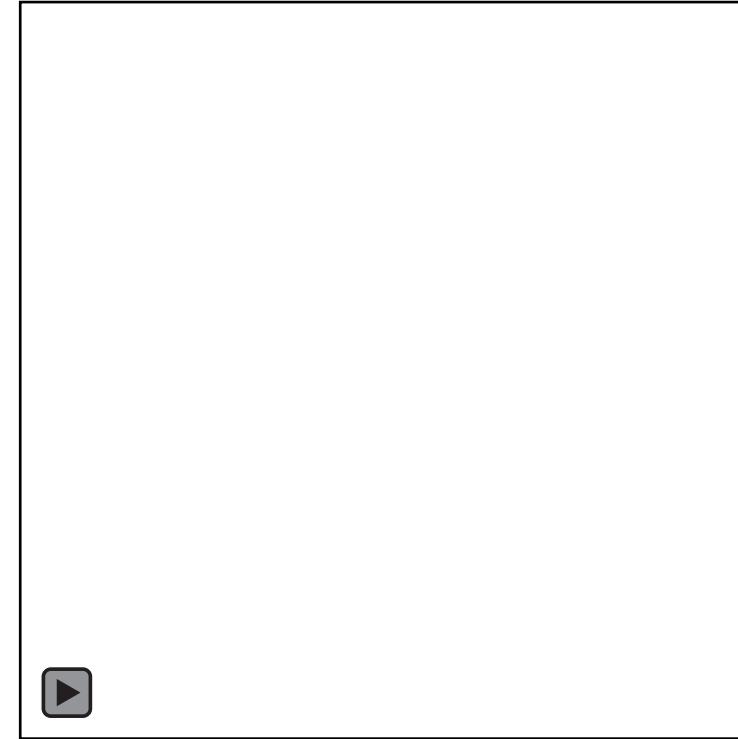
Don't confuse users with inconsistent or disorderly motion.



# Delightful Details



Both icons and sheets of material can transition in concert with one another.



Icons can smoothly change from one image to another to serve dual functions at different times.



# Summary



**Material is the metaphor**  
**Bold, graphic and intentional**  
**Motion provides meaning**



Material Casts  
Shadows

**Key lights**  
**Ambient lights**



Material Is Solid

**Input events only affect the foreground**  
**Cannot pass through material**  
**Elevation to separate material**



# Transforming Material

- Changes shape**
- Grows and shrinks**
- Cannot bend or fold**
- Splits and becomes whole again**



# Animation

- Authentic motion**
- Natural acceleration and deceleration**
- Entrances and exits**
- Meaningful transitions**

