

1. Introduction to Responsive Design

Responsive Web Design (RWD) is a design approach that ensures a website **looks good and functions well on all devices**, including:

- Desktops
- Laptops
- Tablets
- Smartphones

Instead of creating separate websites for each device, **one flexible website adapts automatically** to different screen sizes.

Key principles of responsive design:

1. **Fluid Grid Layouts:**

Use relative units like %, em, rem instead of fixed px for widths and margins.

2. **Flexible Images and Media:**

Images should scale automatically with the screen size:

3. img {
4. max-width: 100%;
5. height: auto;
6. }

7. **Media Queries:**

Allow you to apply different styles depending on device width, height, orientation, or other features.

2. Media Queries Syntax

Basic Syntax:

```
@media (condition) {  
    /* CSS rules */  
}
```

Common conditions:

- max-width → applies CSS **up to** the given width
- min-width → applies CSS **from** the given width
- orientation → portrait or landscape

Example:

```
/* Default styles for desktop */
```

```

body {
    background-color: lightblue;
    font-size: 18px;
}

/* Styles for tablets (width <= 768px) */
@media (max-width: 768px) {
    body {
        background-color: lightgreen;
        font-size: 16px;
    }
}

/* Styles for smartphones (width <= 480px) */
@media (max-width: 480px) {
    body {
        background-color: lightyellow;
        font-size: 14px;
    }
}

```

Explanation:

1. By default, the background is light blue with font-size 18px.
 2. On tablets (screen width \leq 768px), background changes to light green and font-size reduces.
 3. On smartphones (screen width \leq 480px), background changes to light yellow and font-size reduces further.
-

3. Mobile-First Approach

- Start designing for **small screens first** (mobile), then add styles for larger screens.
- Use min-width in media queries:

```

/* Mobile styles (default) */
body {

```

```
font-size: 14px;  
}  
  
/* Tablets and above */  
@media (min-width: 481px) {  
body {  
font-size: 16px;  
}  
}
```

```
/* Desktops and above */  
@media (min-width: 769px) {  
body {  
font-size: 18px;  
}  
}
```

4. Orientation Media Queries

- Detect screen orientation: **portrait** or **landscape**

```
/* Portrait mode */  
@media (orientation: portrait) {  
body {  
background-color: lightpink;  
}  
}
```

```
/* Landscape mode */  
@media (orientation: landscape) {  
body {  
background-color: lightgray;  
}
```

```
}
```

5. Combining Conditions

You can combine multiple conditions using and / ,:

```
/* Tablets in portrait mode */  
 @media (max-width: 768px) and (orientation: portrait) {  
   body {  
     font-size: 15px;  
   }  
 }  
  
/* Multiple devices */  
 @media (max-width: 480px), (max-width: 320px) {  
   body {  
     font-size: 12px;  
   }  
 }
```

6. Practical Example: Responsive Page Layout

```
<!DOCTYPE html>  
  
<html>  
  <head>  
    <style>  
      body {  
        font-family: Arial, sans-serif;  
        margin: 0;  
      }  
    </style>  
  </head>  
  <body>
```

```
.container {  
  display: flex;  
  flex-direction: row;
```

```
padding: 20px;
}

.sidebar {
    width: 25%;
    background-color: #f0f0f0;
    padding: 10px;
}

.content {
    width: 75%;
    padding: 10px;
}

/* Tablets */
@media (max-width: 768px) {
    .container {
        flex-direction: column;
    }

    .sidebar, .content {
        width: 100%;
    }
}

/* Smartphones */
@media (max-width: 480px) {
    .content {
        font-size: 14px;
    }
}

</style>
```

```
</head>

<body>

<div class="container">
  <div class="sidebar">Sidebar</div>
  <div class="content">
    <h1>Responsive Design Example</h1>
    <p>This layout changes according to screen size.</p>
  </div>
</div>

</body>
</html>
```

Behavior:

- Desktop: Sidebar 25%, Content 75% side by side
- Tablet: Sidebar and Content stacked vertically
- Mobile: Font size reduced for readability