RESPONSIVE WEB DESIGN II

Lecture 9

TODAY'S TOPICS

- Image Optimization

- Responsive Images

- **Exercise:** Picture This!

ANNOUNCEMENTS

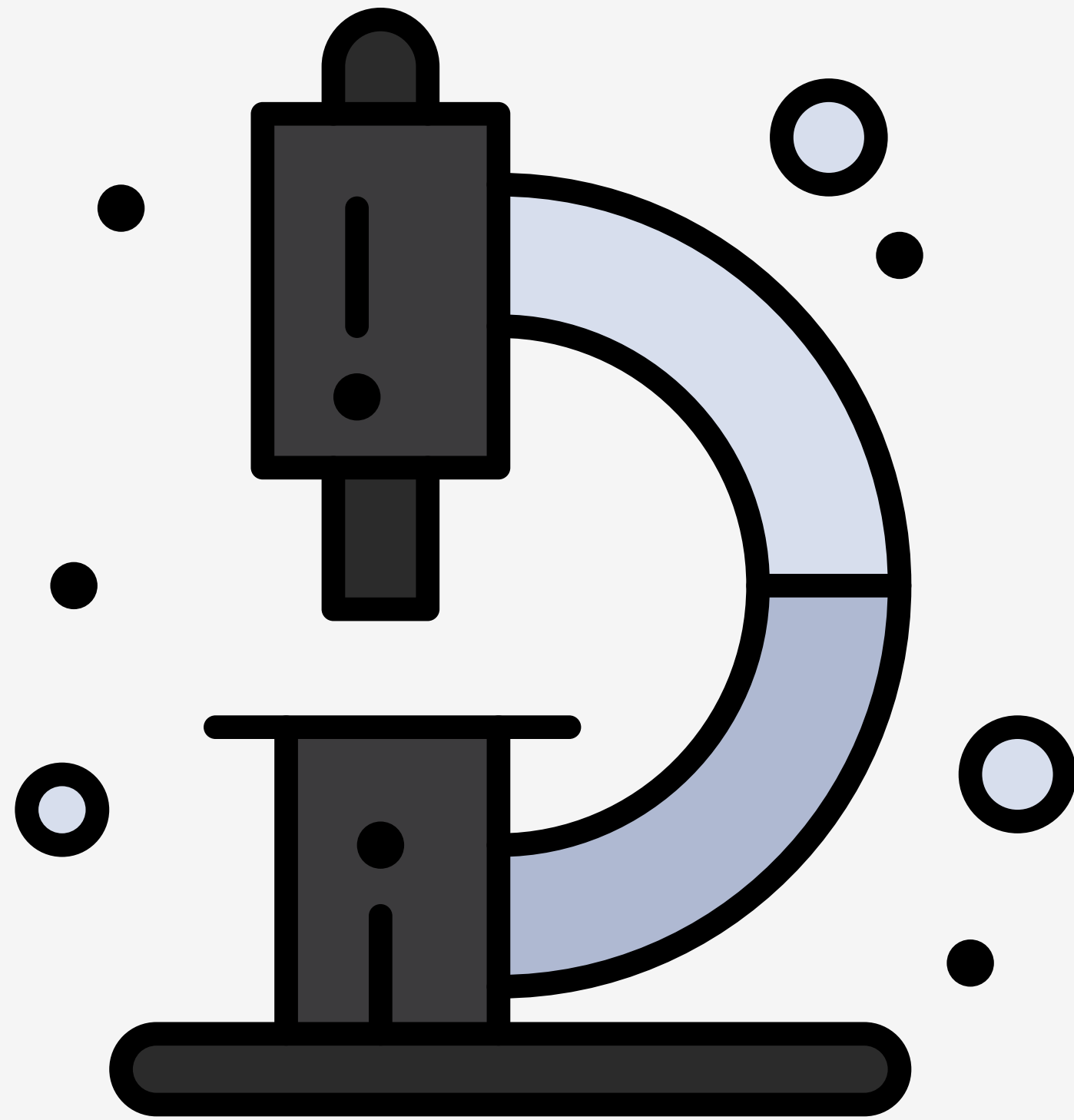- Sign-in Sheet

- Recordings
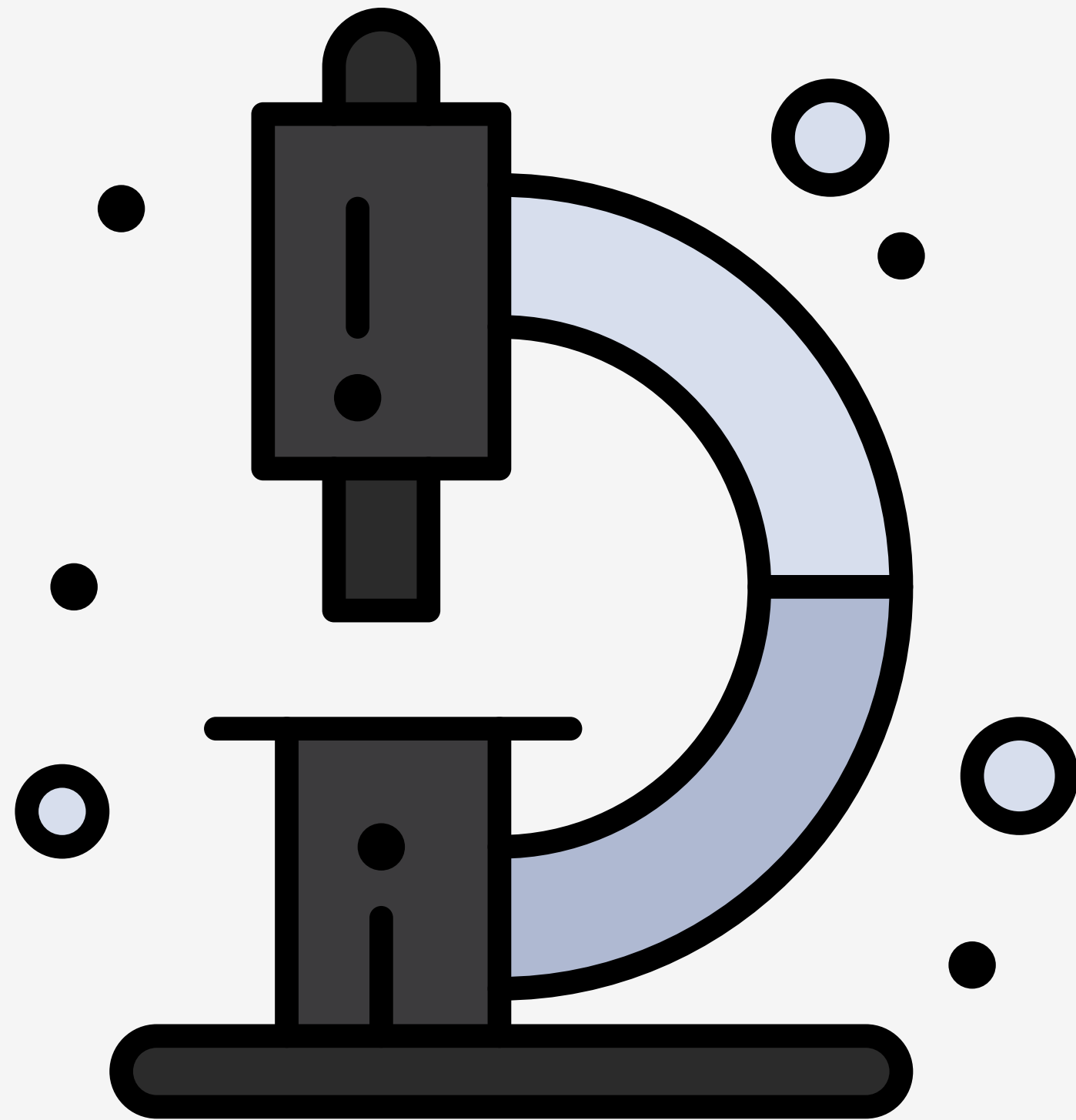
- Midterm Project

QUESTIONS

IMAGE OPTIMIZATION

IMAGES ON THE WEB

- Images often account for most of the downloaded bits on a web page

- Image optimization is the process of eliminating, replacing or decreasing the size of an image while still maintaining quality and visual appeal
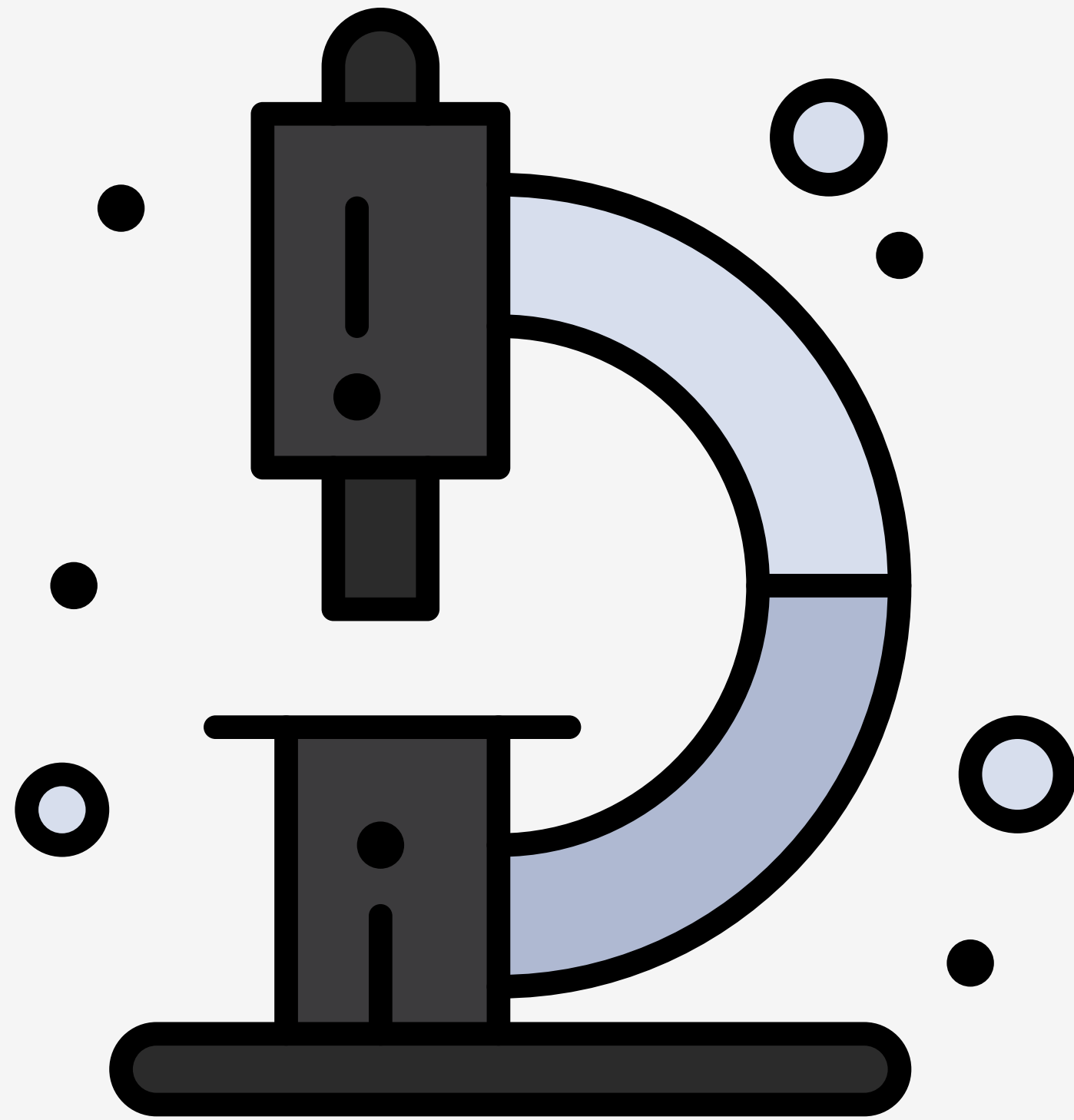
ELIMINATING / REPLACING IMAGES

- Confirm that an image is necessary or serves a purpose

- Can the image be replaced using HTML, CSS, and / or JavaScript

  - web fonts

  - CSS effects (gradients, shadows)
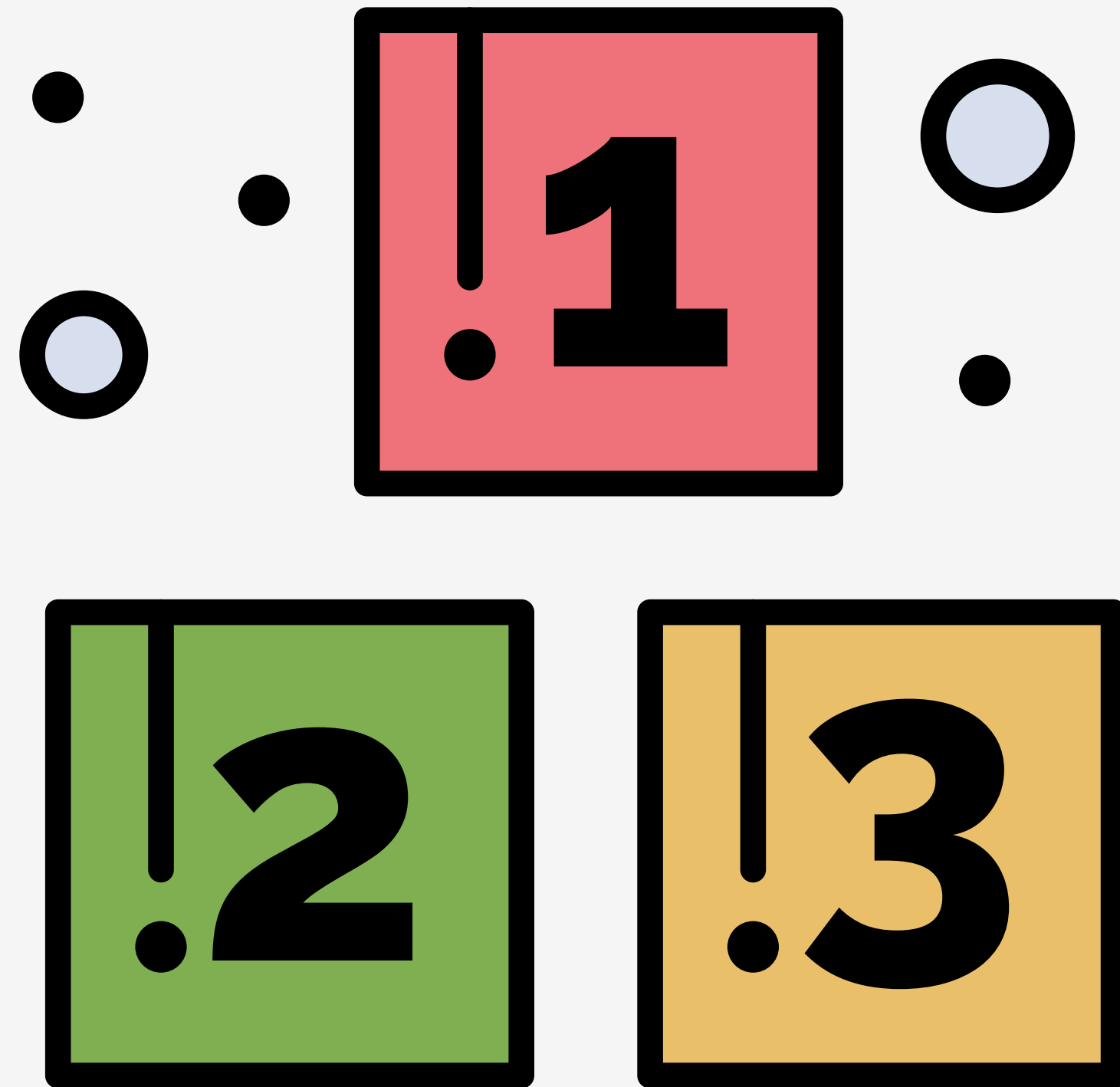
  - web animations

DECREASING THE SIZE OF IMAGES

- Vector or Raster

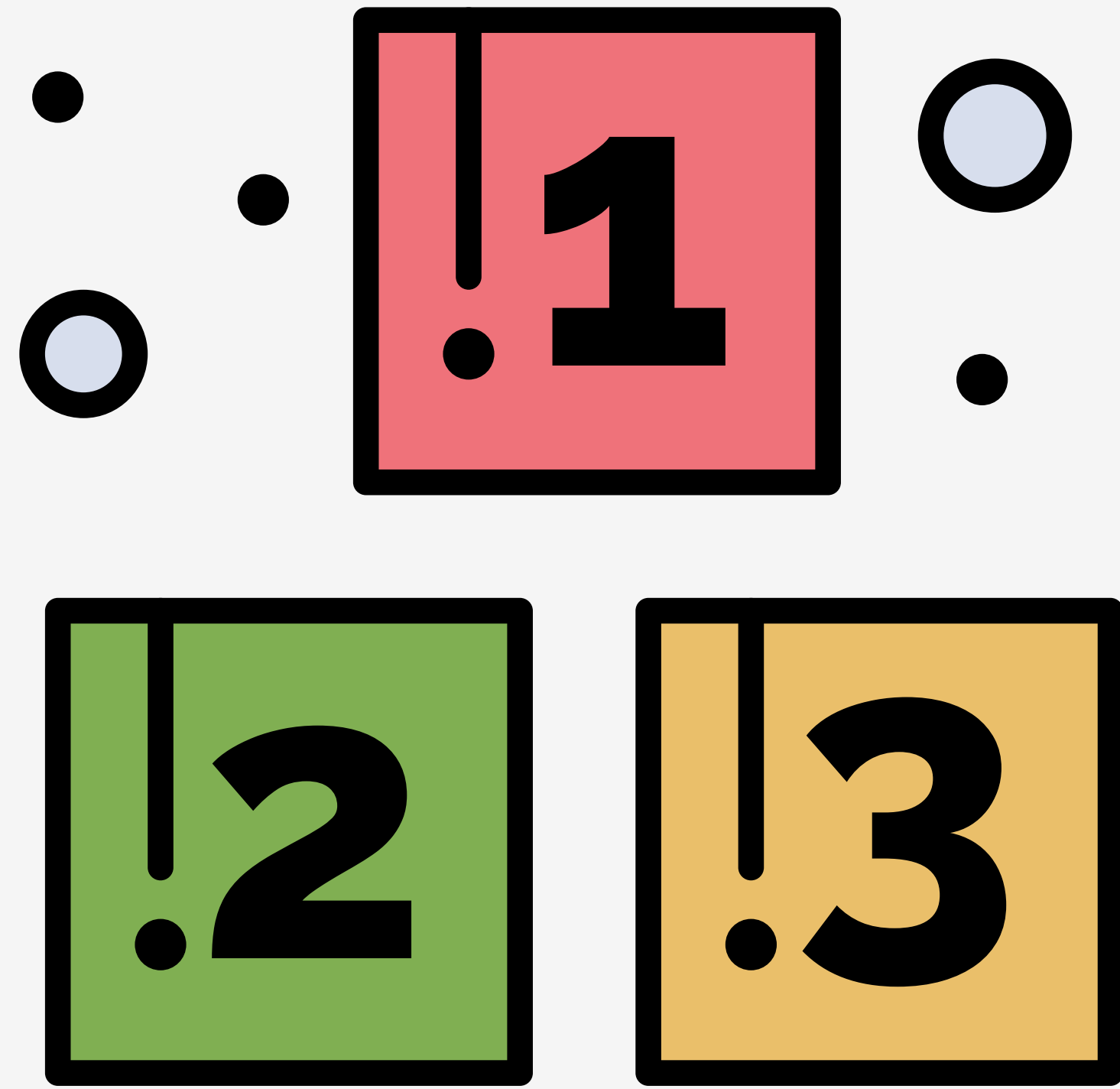- Image format

- Image resolution

- Image compression

RASTER IMAGES

- **Raster images** are created using a series of pixels placed in a rectangular grid

- **Raster images** are not resolution independent

- **Raster images** work best for complex image like photos

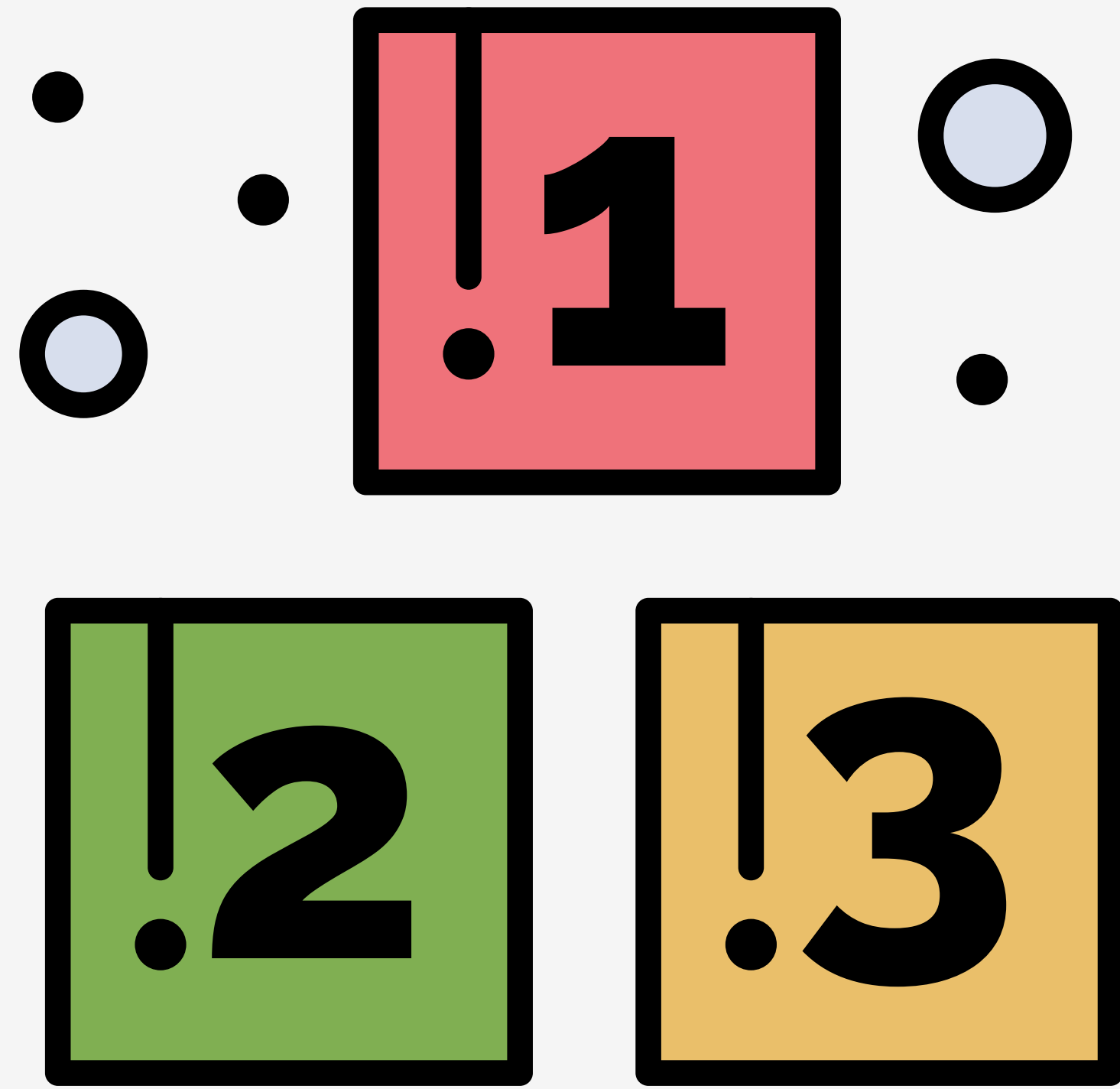- Common formats: GIF, PNG, JPEG, WebP

GRAPHIC INTERCHANGE FORMAT (GIF)

- Universally supported

- Lossless compression

- Limited to 256 colors

- Supports animation

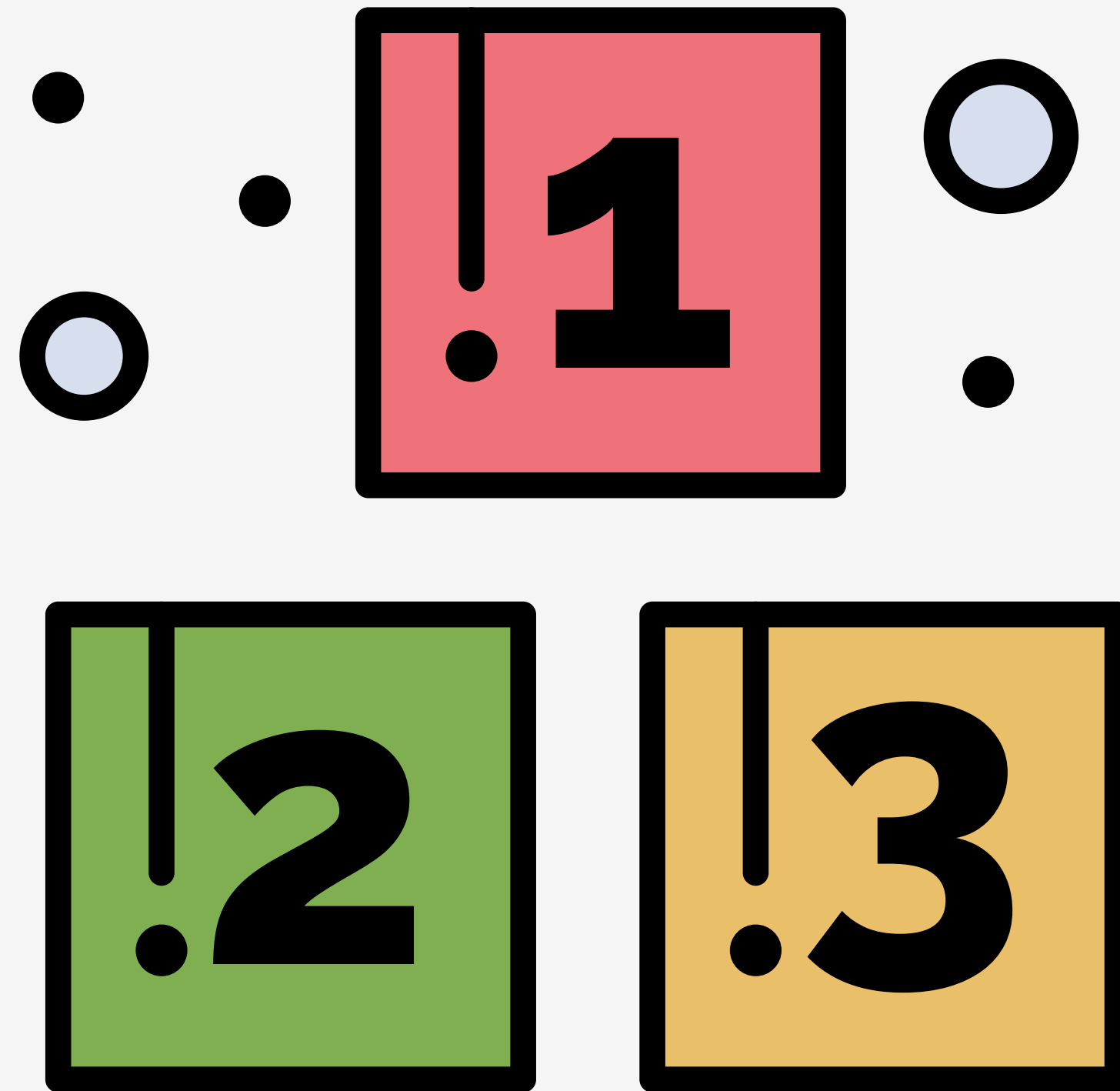- Used for very simple graphics and animation

PORTABLE NETWORK GRAPHICS (PNG)

- Replacement for GIF
- Universally supported
- Lossless compression
- Supports Transparency
- Used for simple graphics, icons, and illustrations
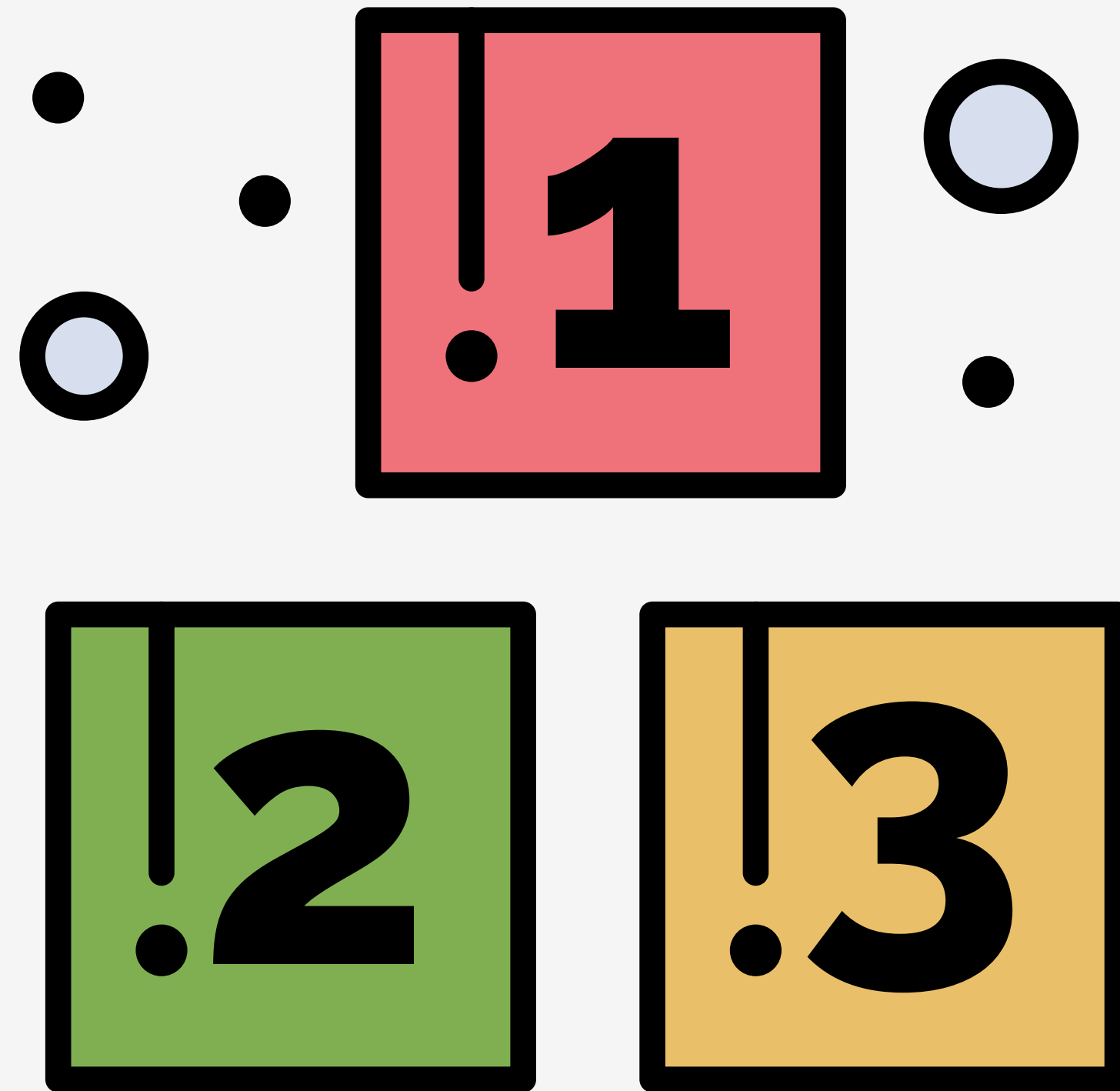
JOINT PHOTOGRAPHIC EXPERTS GROUP (JPEG)

- Universally supported
- Lossy compression
- Supports wide range of colors
- Maintains small file size
- Used for photography

WEBP

- Competitor to JPEG

- *NOT* universally supported

- Lossy and Lossless compression

- Future support for transparency and animation

- Maintains very small file size

- Used for photography

VECTOR IMAGES
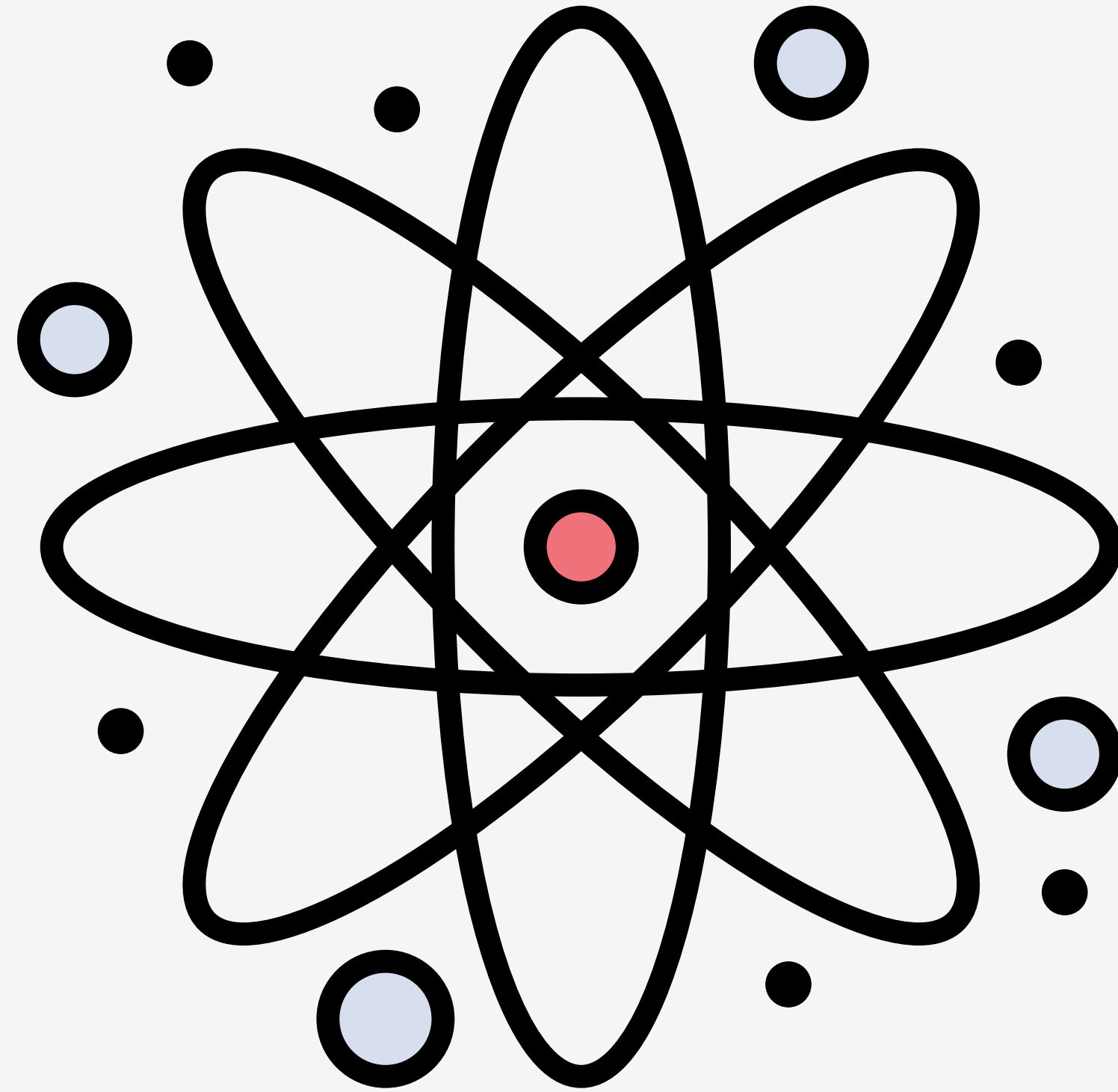
- **Vector Images** are created using lines, points, and polygons to represent an image

- **Vector images** are resolution-independent

- **Vector images** work best for images consisting of simple geometric shapes like icons or logos

- **Common formats:** SVG

SCALABLE VECTOR GRAPHICS (SVG)
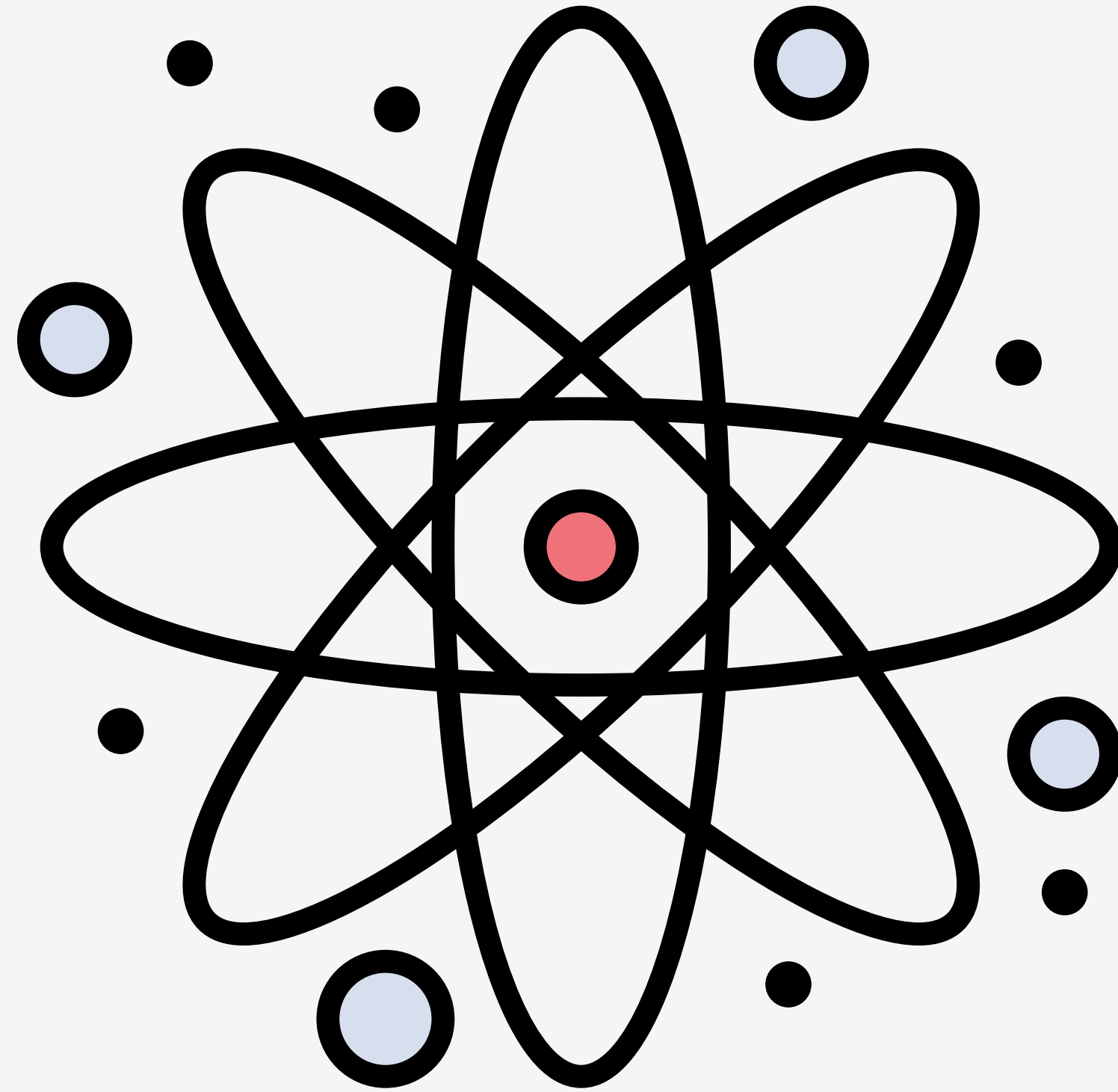
- XML-based image format

- SVG mark-up can directly inserted into HTML

- Can be manipulated with CSS and JavaScript

- Resolution independent

- Can be minified

- Used for simple graphics

COMPRESSION
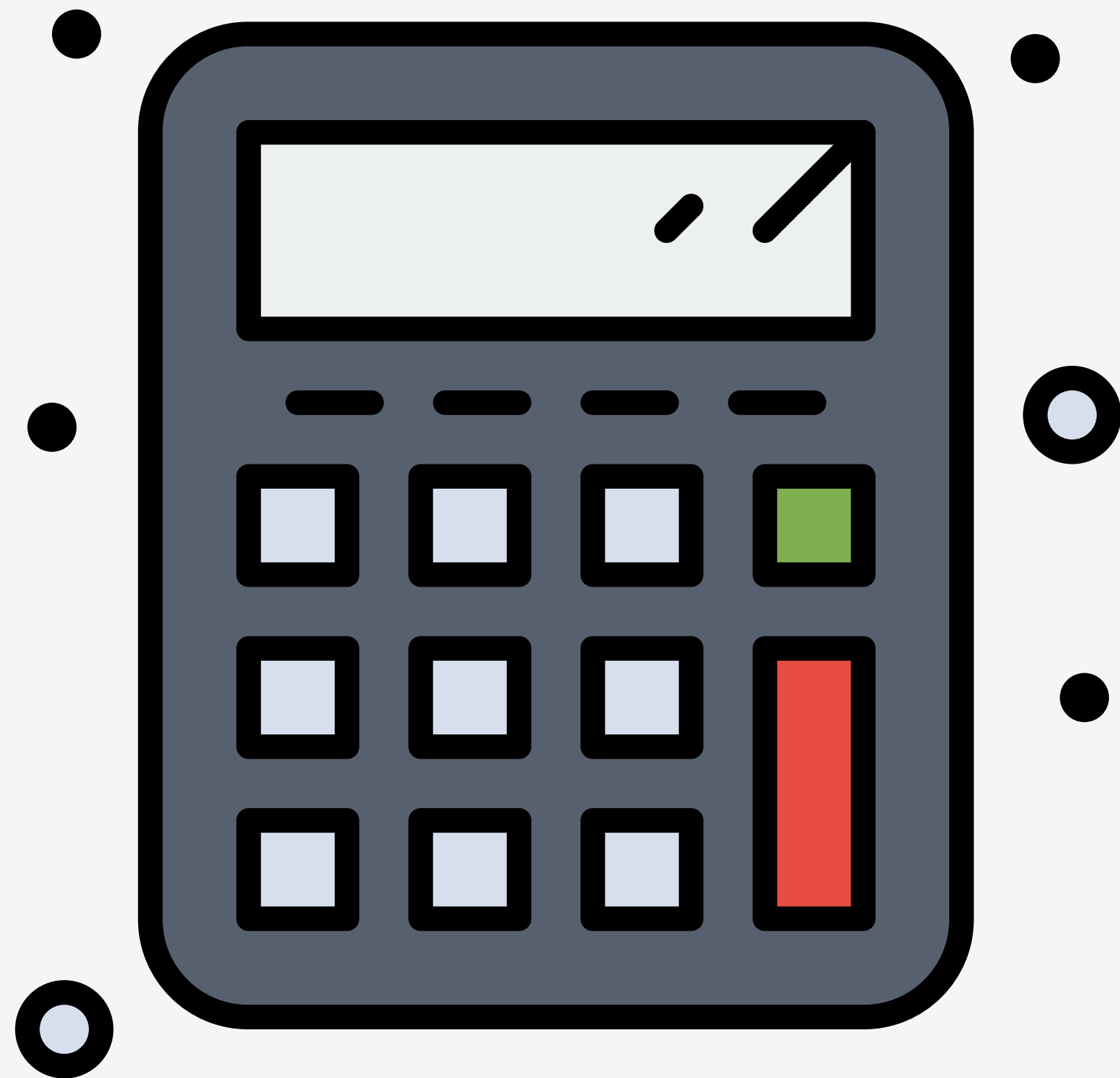
- Lossy compression

  - Eliminate pixels data

  - Quality loss

  - Significant size decrease

- Lossless compression

  - Compresses the pixel data

  - Maintains quality

  - Less significant size decrease

RESOLUTION
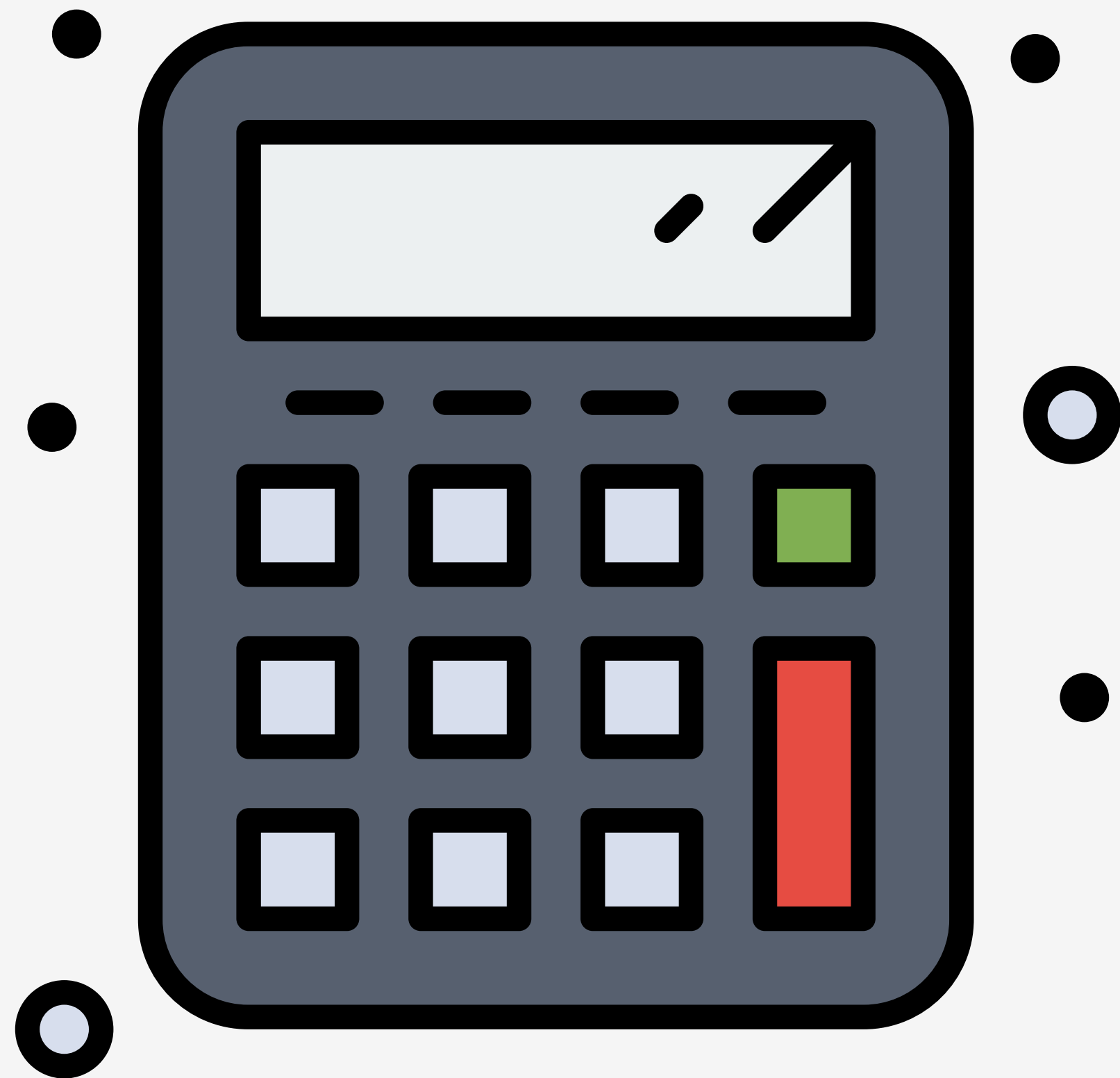
- The higher resolution, the larger file size

- Avoid wasting pixels

- Higher resolution screens will require larger images

1x			1x
320px			
640px			
960px			
1280px			

1x	2x		
320px	640px		
640px	1280px		
960px	1920px		
1280px	2560px		

1x	2x	3x	4x
320px	640px	960px	1280px
640px	1280px	1920px	2560px
960px	1920px	2880px	3840px
1280px	2560px	3840px	5120px

1x	2x	3x	4x
320px	640px	960px	1280px
640px	1280px	1920px	2560px
960px	1920px		
1280px	2560px		

	1x	2x	3x	4x
320px			
640px			
960px	1920px		
1280px	2560px		

RESPONSIVE IMAGES

CSS SIZING
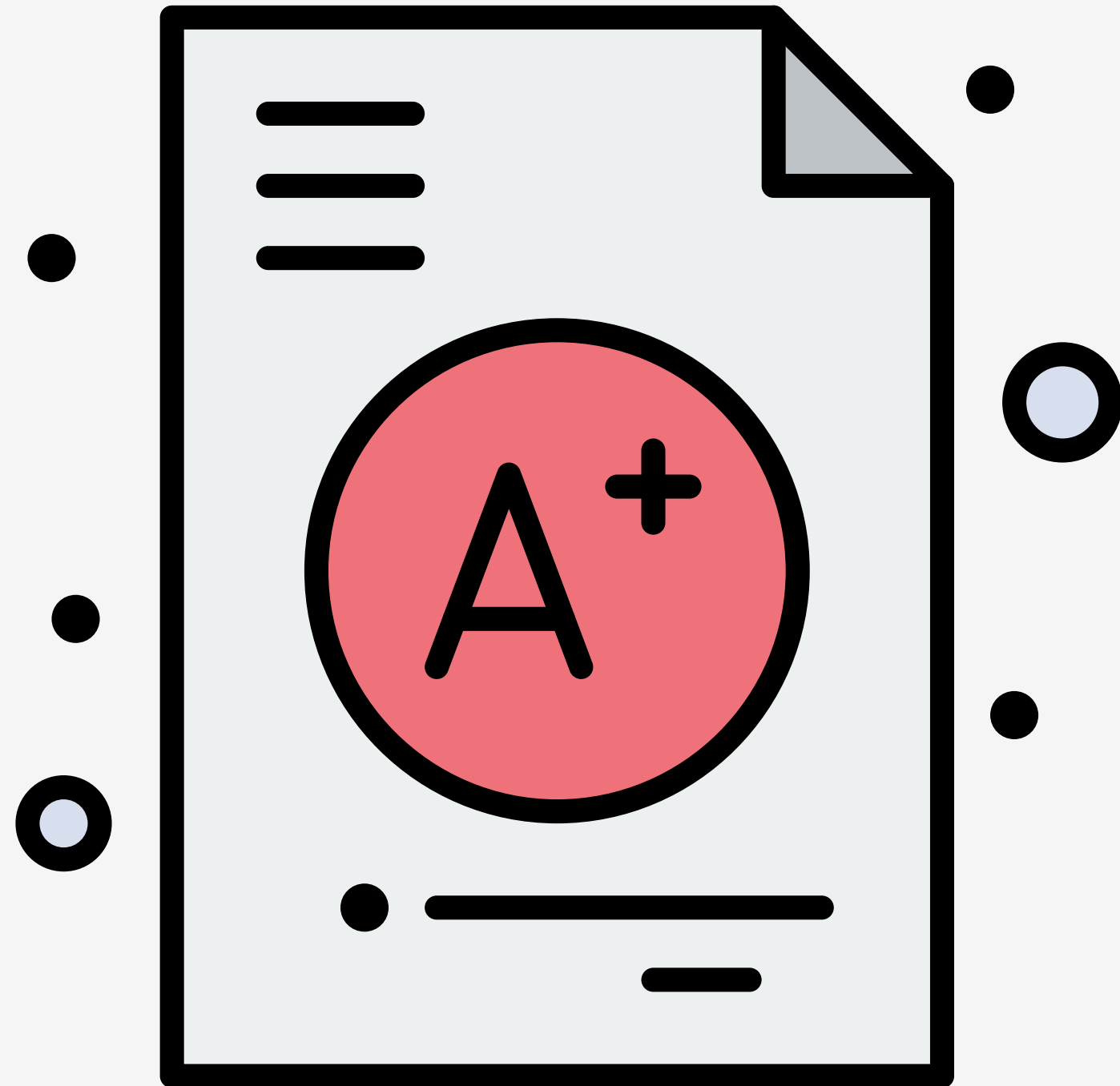
- Images by default are inline and will take the space they need

- CSS can be applied to make the image respond to the size of the parent

A+

CSS SIZING

```html
<div class="image-container">
  <img src="img/books.jpg"
    alt="Books on a shelf">
</div>
```

```css
img {
  display: block;
  max-width: 100%;
}
```
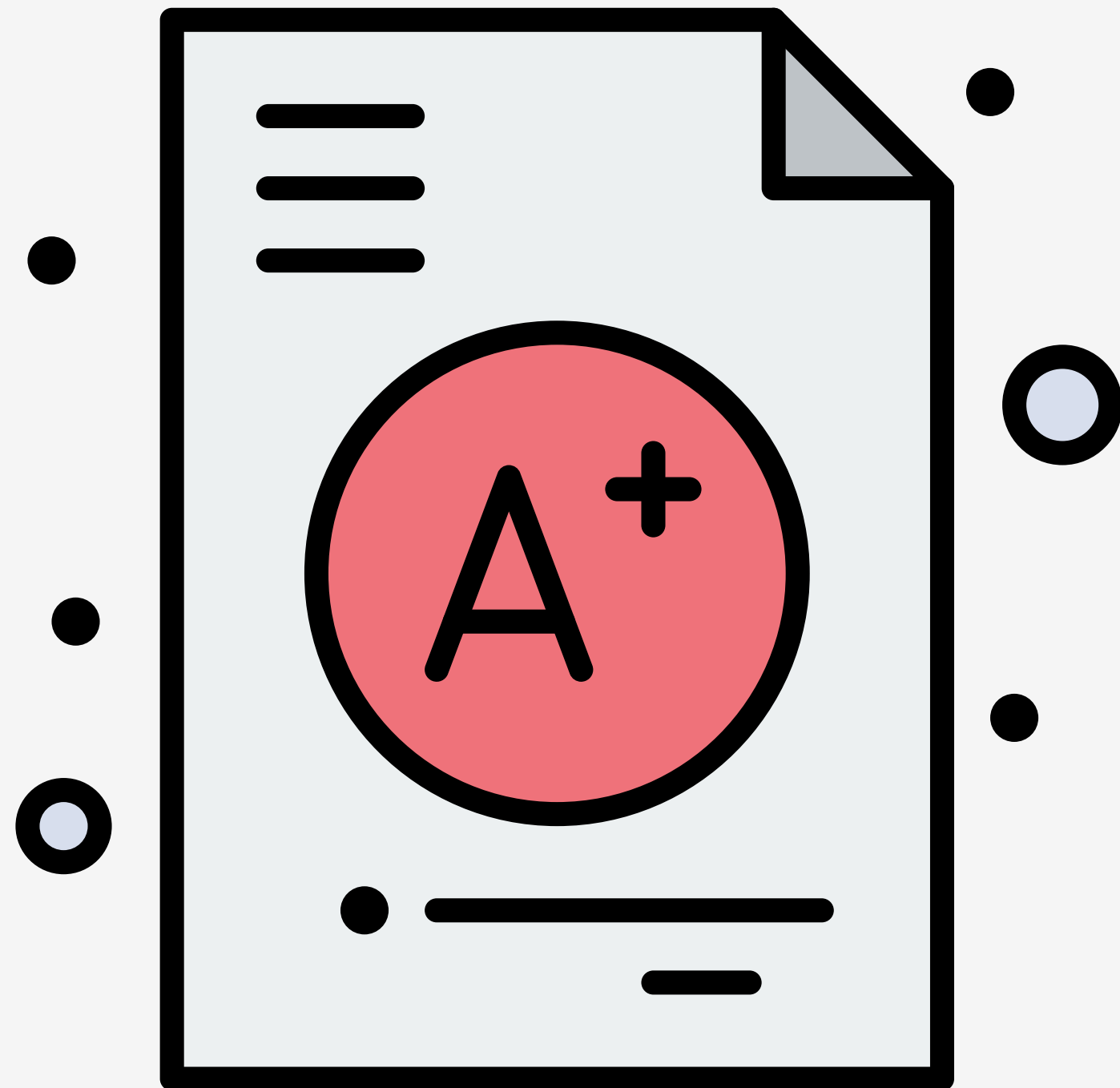
SRCSET

- The `srcset` attribute defined a list of images

- Each image should include the related size or the pixel density

- The browser will determine which image to use based on the viewport size and screen resolution

SRCSET

```html
<!-- sizes -->
<img
  srcset="img/books-400.jpg 400w,
          img/books-800.jpg 800w,
          img/books-1200.jpg 1200w"
  src="img/books-800.jpg"
  alt="Books on a shelf">


<!-- density -->
<img
  srcset="img/books-400.jpg,
          img/books-800.jpg 2x,
          img/books-1200.jpg 3x"
  src="img/books-800.jpg"
  alt="Books on a shelf">
```
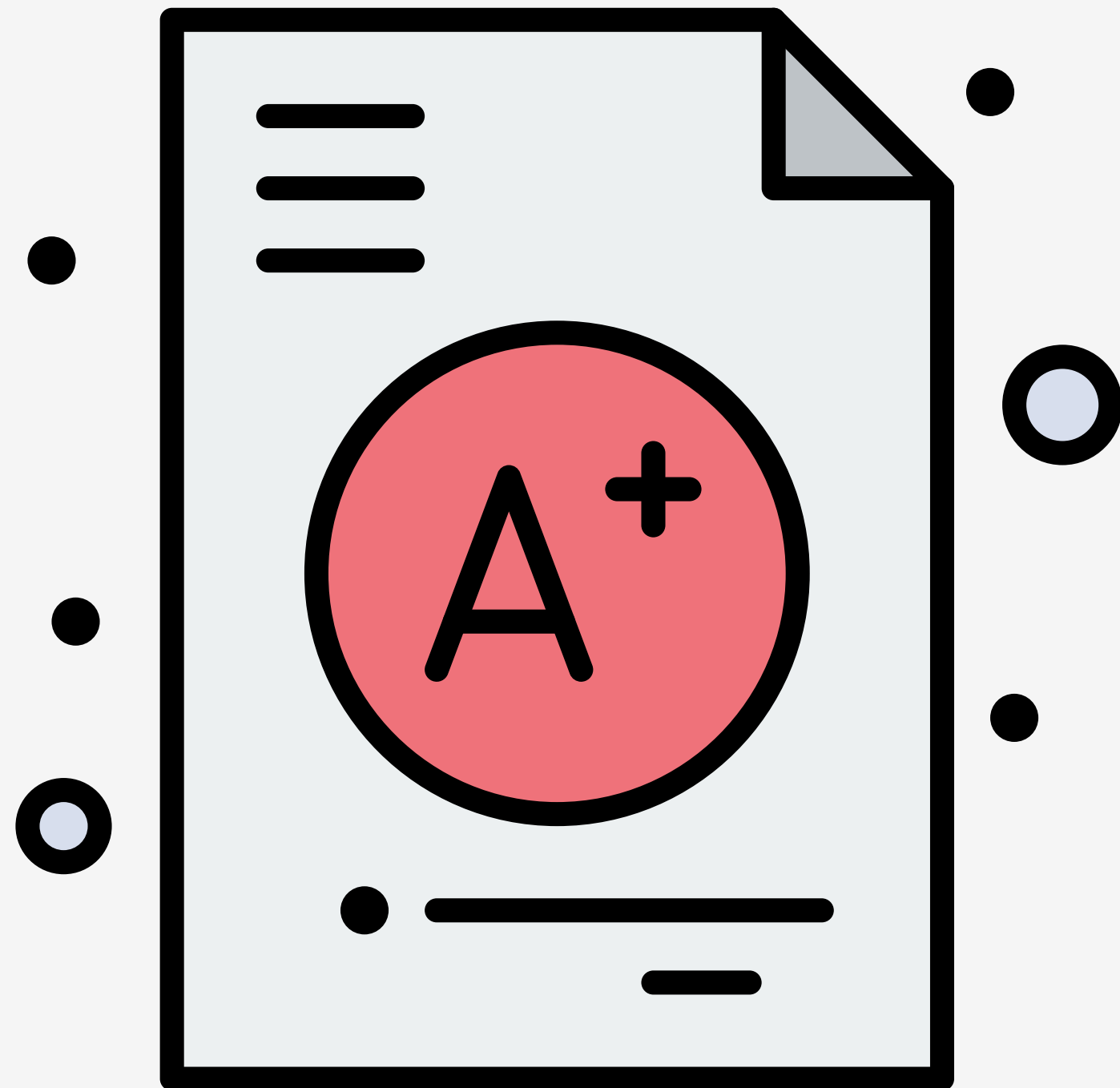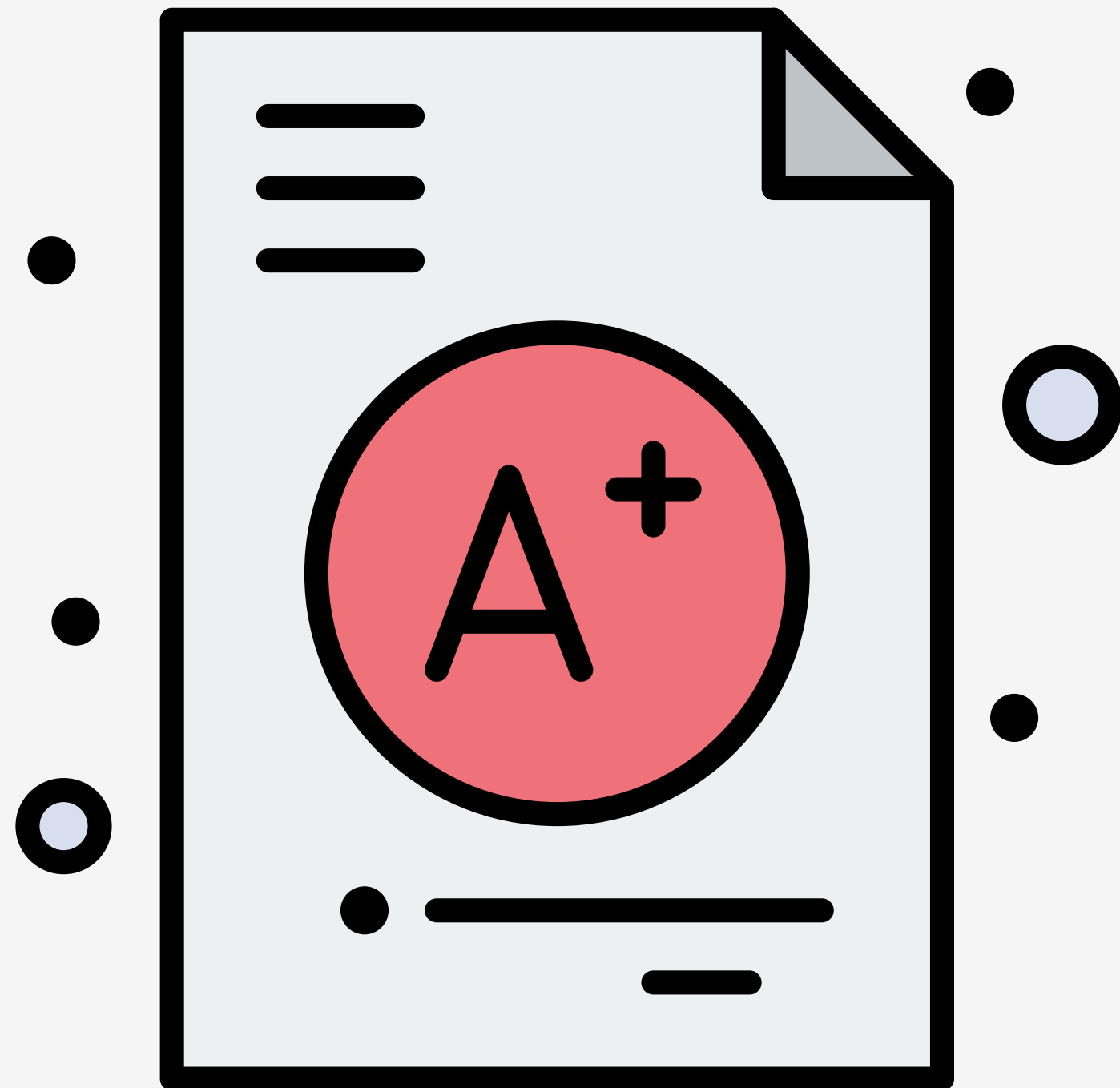
SIZES

- The `sizes` defines the size of the image at each viewport size

- Each image size is defined with the appropriate media query

- Image sizes can in fixed units, like `px`, or relative units, like `vw`.

- If no sizes attribute is included, the browser will assume `100vw`.

SIZES

```html
<img
    srcset="img/books-400.jpg 400w,
            img/books-800.jpg 800w,
            img/books-1200.jpg 1200w"
    sizes="(min-width: 1024px) 25vw,
           (min-width: 800px)  50vw,
           100vw"
    src="img/books-800.jpg"
    alt="Books on a shelf">
```

PICTURE

- The `<picture>` element, along with the `<source>`, can be used to display different types of images

- The `<picture>` element can be used to provide images of different formats or different aspect ratios

- A media attribute, applied to the `<source>` tag, take the media queries for when to use the specific source

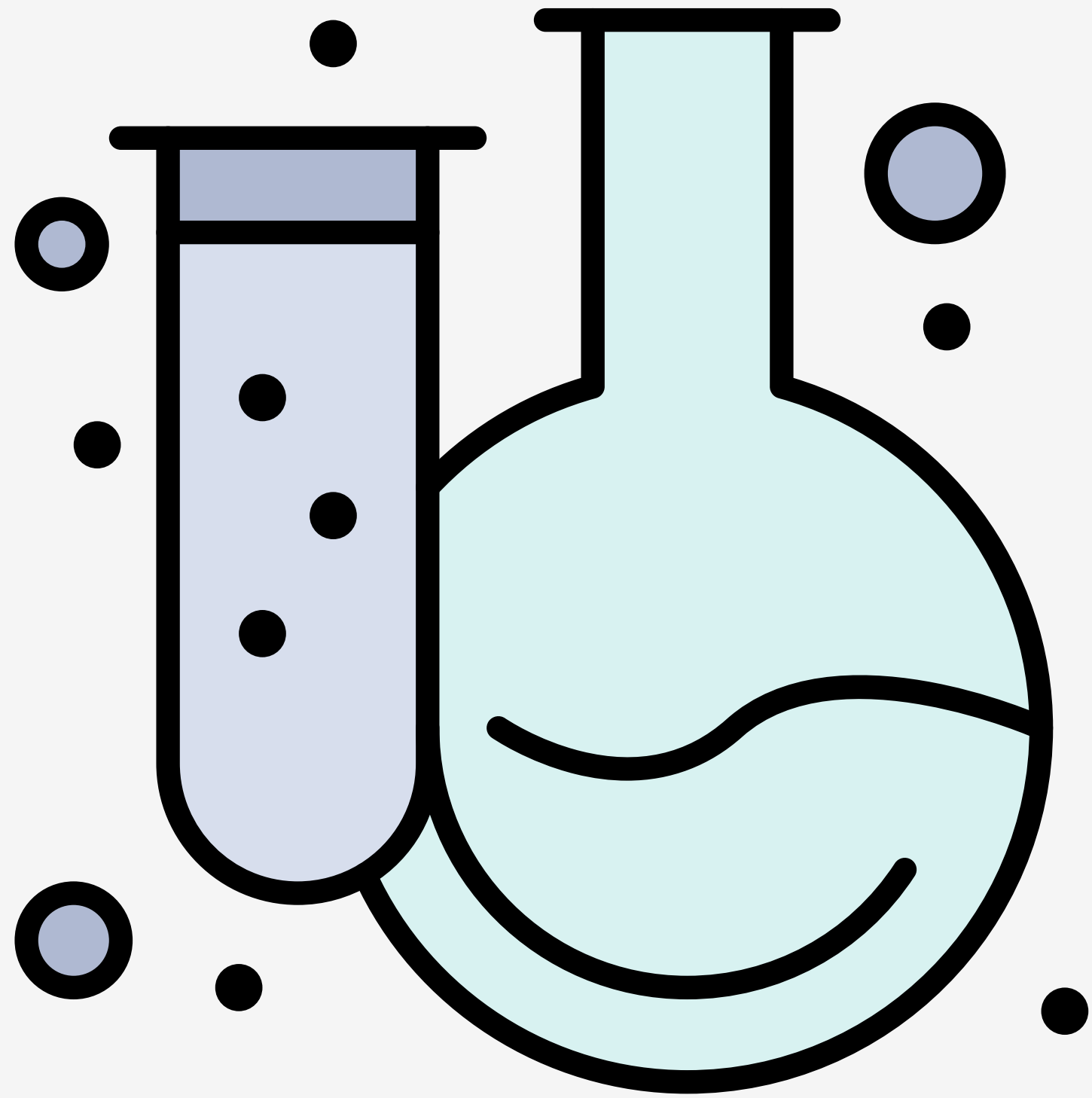- An `<img>` element should always be included inside a `<picture>` element

PICTURE

```html
<picture>
  <source srcset="img/books-400.jpg 400w,
                  img/books-800.jpg 800w,
                  img/books-1200.jpg 1200w"
          media="(max-width: 960px)">

  <source srcset="img/books-square-400.jpg 400w,
                  img/books-square-600.jpg 600w,
                  img/books-square-800.jpg 800w,"
          sizes="50vw"
          media="(min-width: 961px)">
  <img src="img/books-800.jpg"
    alt="Books on a shelf">
</picture>
```
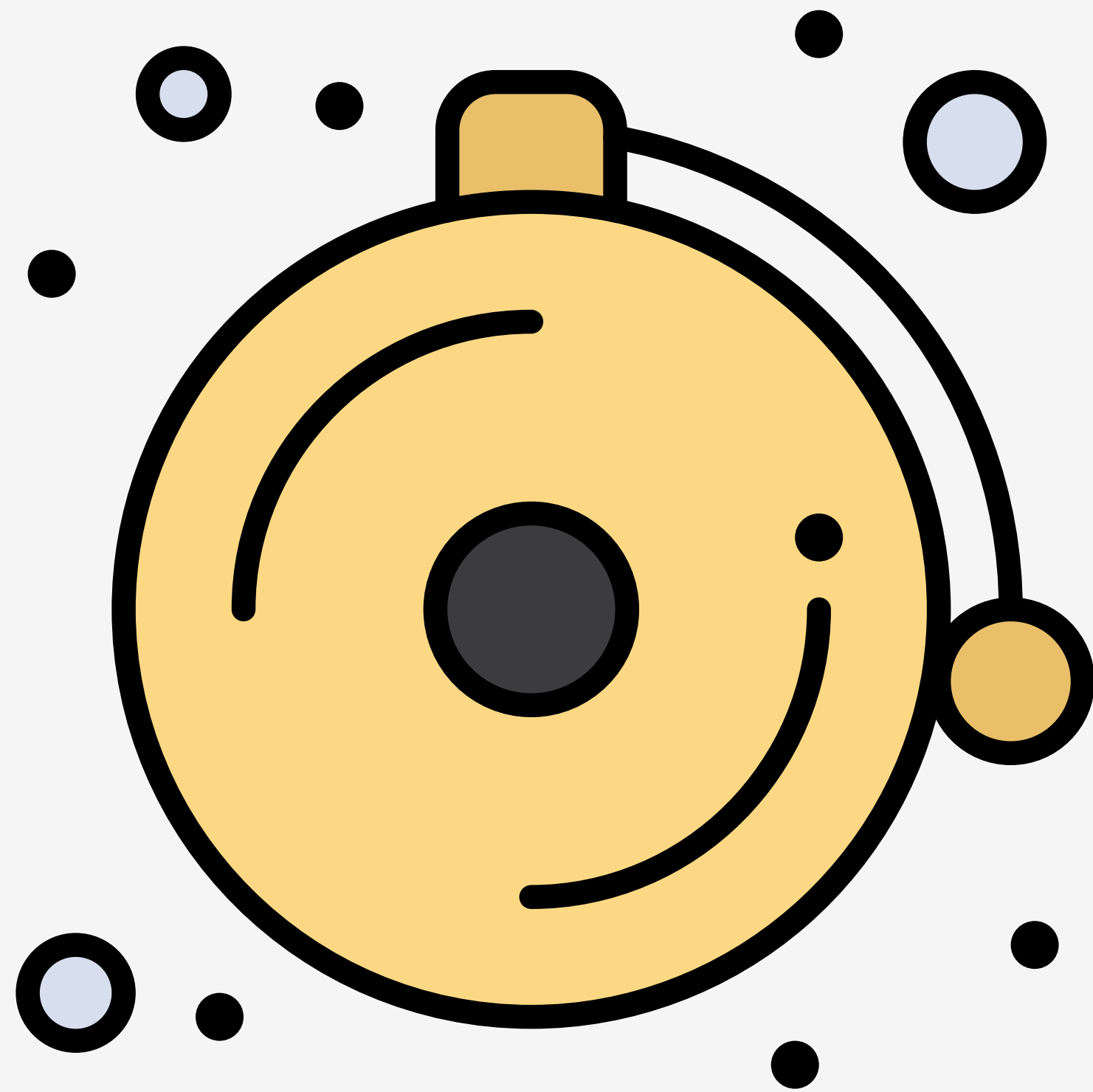
PICTURE THIS!

- Download the starter files

- Update the HTML and CSS to make the image responsive and match the provided screenshots

- Post to your GitHub Pages

- *DUE:* Tue. Feb 4 @ 11:59 PM

NEXT TIME...

- Work period (No Lecture)

- Landing Page - *DUE THURSDAY*