

shader()

Sets the `p5.Shader` object to apply while drawing.

Shaders are programs that run on the graphics processing unit (GPU). They can process many pixels or vertices at the same time, making them fast for many graphics tasks. They're written in a language called `GLSL` and run along with the rest of the code in a sketch. `p5.Shader` objects can be created using the `createShader()` and `loadShader()` functions.

The parameter, `s`, is the `p5.Shader` object to apply. For example, calling `shader(myShader)` applies `myShader` to process each pixel on the canvas. The shader will be used for:

- Fills when a texture is enabled if it includes a uniform `sampler2D`.
- Fills when lights are enabled if it includes the attribute `aNormal`, or if it has any of the following uniforms: `uUseLighting`, `uAmbientLightCount`, `uDirectionalLightCount`, `uPointLightCount`, `uAmbientColor`, `uDirectionalDiffuseColors`, `uDirectionalSpecularColors`, `uPointLightLocation`, `uPointLightDiffuseColors`, `uPointLightSpecularColors`, `uLightingDirection`, or `uSpecular`.
- Fills whenever there are no lights or textures.
- Strokes if it includes the uniform `uStrokeWeight`.

The source code from a `p5.Shader` object's fragment and vertex shaders will be compiled the first time it's passed to `shader()`. See [MDN](#) for more information about compiling shaders.

Calling `resetShader()` restores a sketch's default shaders.

Note: Shaders can only be used in WebGL mode.

Examples

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// Note: A "uniform" is a global variable within a shader program.

```
// Create a string with the vertex shader program.
// The vertex shader is called for each vertex.
let vertSrc = `
precision highp float;
uniform mat4 uModelViewMatrix;
uniform mat4 uProjectionMatrix;

attribute vec3 aPosition;
attribute vec2 aTexCoord;
varying vec2 vTexCoord;

void main() {
    vTexCoord = aTexCoord;
    vec4 positionVec4 = vec4(aPosition, 1.0);
    gl_Position = uProjectionMatrix * uModelViewMatrix *
positionVec4;
}
`;

// Create a string with the fragment shader program.
// The fragment shader is called for each pixel.
let fragSrc = `
precision highp float;
```

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// Note: A "uniform" is a global variable within a shader program.

```
let mandelbrot;

// Load the shader and create a p5.Shader object.
function preload() {
    mandelbrot = loadShader('/assets/shader.vert',
'/assets/shader.frag');
}

function setup() {
    createCanvas(100, 100, WEBGL);

    // Use the p5.Shader object.
    shader(mandelbrot);

    // Set the shader uniform p to an array.
    mandelbrot.setUniform('p', [-0.74364388703, 0.13182590421]);

    describe('A fractal image zooms in and out of focus.');
}

function draw() {
    // Set the shader uniform r to a value that oscillates
    // between 0 and 2.
    mandelbrot.setUniform('r', sin(frameCount * 0.01) + 1);

    // Add a quad as a display surface for the shader.
```

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// Note: A "uniform" is a global variable within a shader program.

```
let redGreen;
let orangeBlue;
let showRedGreen = false;

// Load the shader and create two separate p5.Shader objects.
function preload() {
    redGreen = loadShader('/assets/shader.vert', '/assets/shader-
gradient.frag');
    orangeBlue = loadShader('/assets/shader.vert',
'/assets/shader-gradient.frag');
}

function setup() {
    createCanvas(100, 100, WEBGL);

    // Initialize the redGreen shader.
    shader(redGreen);

    // Set the redGreen shader's center and background color.
    redGreen.setUniform('colorCenter', [1.0, 0.0, 0.0]);
    redGreen.setUniform('colorBackground', [0.0, 1.0, 0.0]);

    // Initialize the orangeBlue shader.
    shader(orangeBlue);
```

Syntax

`shader(s)`

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Parameters

`s` `p5.Shader`: `p5.Shader` object to apply.

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Related References

`copyToContext`
Copies the shader from one drawing context to another.

`inspectHooks`
Logs the hooks available in this shader, and their current implementation.

`modify`
Returns a new shader, based on the original, but with custom snippets of shader code replacing default behaviour.

`setUniform`
Sets the shader's uniform (global) variables.

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